User's Guide™

TO CP/M® SYSTEMS & SOFTWARE

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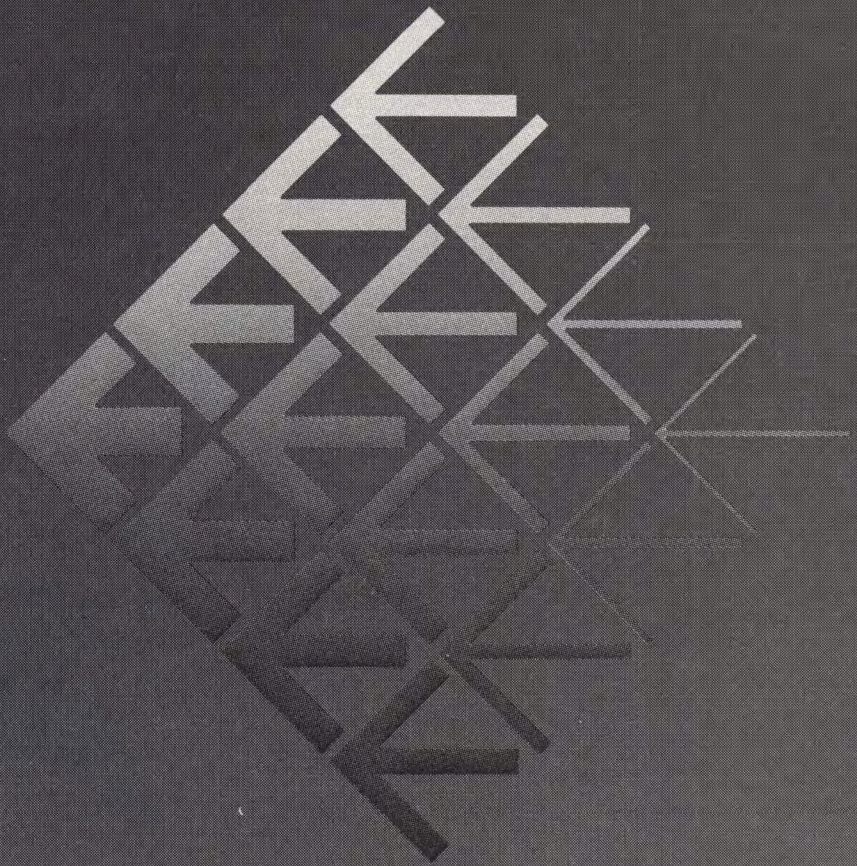

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User's Guide
TO **CP/M** SYSTEMS & SOFTWARE

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About the Cover

This issue's cover art is Michelangelo's *Isaiah*, with additional features by Sahnta Pannutti. The prophet may have just noticed the computer as a research and writing tool, and may soon announce that the personal computing renaissance is upon us all.

Many newcomers are attracted to the word processing capabilities of personal computers. As inexpensive desktop and portable computers replace the traditional typewriters and expensive word processing machines, computer users are becoming more productive, and writers are becoming more prolific.

As Henry Louis Mencken put it, "there is in writing the constant joy of sudden discovery, of happy accident." Learn to write with a computer, and your discoveries, however accidental, will stimulate your curiosity for the world of personal computing.

Contents

Vol.1, No.2 December 1982/January 1983

Foreword...
Renaissance 2

For starters...
Writing, Editing, and Budgeting 4
Observations on word processing and spreadsheet calculating.

CP/M Tutorial...
BIOS, Files and the Directory 6
by Tony Bove & Cheryl Rhodes
An overview of CP/M files, directories and the internal BIOS module.

Disk Doctor: ℞ for Bad Disks 12
by Ed Coudal
Bad sector errors? Foul floppies? The case of the disappearing data? Call The Disk Doctor, a program that can diagnose disk disease and recover data from damaged disks.

Tutorial...
A Guide to SuperCalc: Part One 18
by Tony Bove & Cheryl Rhodes
Lesson One: editing a sample balance statement.

Tutorial...
A Guide to Using WordStar: Part One 28
by Tony Bove & Cheryl Rhodes
Part one of this tutorial leads you through a comprehensive session with the star of microcomputer word processors.

An Impatient User's Guide...
WordStar Writing and Editing Summary 48
by Tony Bove & Cheryl Rhodes
A summary of WordStar writing and editing commands.

Installation Guide...
Installing WordStar 54
For displays, printers, and default edit settings.

System Overview...
The Osborne Version of WordStar 60
The Osborne Portable Computer packs a small screen with a powerful word processing and spread-sheet calculating program.

JobStream CP/M from Aton 64
A version of CP/M-80 for the Radio Shack Model II computer.

Glossary...
Word Processing Terminology 47
Some of the jargon used in this issue.

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Foreword...

RENAISSANCE

At the risk of sounding trite, we are celebrating the renaissance of microcomputing. Yes folks, it has finally arrived.

How can we tell? There was no distinct turning point, although many point to the introduction of the IBM Personal Computer or the Osborne Portable Computer as a key product ushering in the new age of consumer-oriented computing products. Although these products may have done just that, a renaissance happens in the mind, not in ads or on the shelves of retail stores. The collective mind of the world has fully embraced microcomputing.

We noticed some tell-tale signs:

- Computers are advertised on the radio as if they are stereos or televisions.
- Standards are appearing in the micro industry and well-known programs have survived several years of use to become "standard" software packages by which usefulness is measured.
- The machines are actually becoming more useful and less expensive at the same time.
- The acronmym "CP/M" appears in consumer-oriented advertisements, and many consumers know what it means.
- Color graphics are appearing on more CP/M system displays. This may not mean much to you, but to us it is significant, since CP/M has traditionally meant serious (dull?) business software with no graphics capabilities.

Computing is rapidly becoming the most popular hobby or pasttime of the country. Microcomputer technology is supported in foreign lands with government subsidies. Doctors, lawyers and entrepreneurs double as software authors serving their vertical markets. Writers and journalists were quick to jump on the wagon and replace their expensive word processors with microcomputers.

In surveys of users around the world, results consistently showed the three most typical microcomputer activities to be word processing, data base management, and finanical planning. This issue provides a tutorial on the most popular microcomputer program for word processing — WordStar, from MicroPro International. This issue also starts a tutorial on a popular spreadsheet financial planner — SuperCalc, from SORCIM Corp.

You may have noticed that this is not a typical computer magazine. We intend to supply the best documentation of CP/M and MP/M systems and software to the 700,000+ users of these products.

It so happens that a magazine provides an ideal format for such documentation. Magazines can be put together quickly by using CP/M systems for writing, editing and preparing for typesetting. Our experiences with handling a subscriber data base integrated with accounting and data base management software provide a framework for describing useful computer applications.

Magazines can also be sold on newsstands and in retail book and computer outlets. A user of a particular set of programs can buy the inidividual issues covering those programs. However, the best deal is for subscribers: they receive complete training courses in the most useful CP/M products we can find, for a low subscription price per year.

The most compelling reason to provide such a service is that no such service exists. In the early days of minicomputer systems, companies offered a subscription service to provide updated documentation with the software updates. The price was high, but the idea was a good one.

We do not offer software or updates of software programs. We offer useful documentation and articles about specific applications, in both magazine and reprint form. We are functioning independently, to remain "objective" in our descriptions of products.

We use our technical writing experience to test the products and our examples. We also suggest improvements to the producers and packagers of these products, as we did for computer manufacturers (as technical writers).

We describe only products we use, and avoid bad-mouthing products that are better left unmentioned. The primary objective is to be of service to users.

We received a lot of supportive mail, but a few complaints were also received. Some readers are CP/M enthusiasts who've nurtured their systems since the age of the hobbyist. These readers wanted more sophisticated information in the first issue.

Their complaints are valid, but so are our reasons for providing an entire CP/M tutorial issue for beginners. We were strongly influenced by the fact that a previous CP/M tutorial we wrote, which is now out of print, reached less than 10,000 actual CP/M users in a marketplace of over 700,000!

First-time users can start with the first issue's tutorial. This "canon" issue unlocks the mysteries of CP/M and provides a reference point for beginners. We will try to stock this issue as a back issue, and at the very least provide the articles in reprint form.

Next issue will include advanced lessons in WordStar and SuperCalc, an impatient user's guide to SuperCalc, more on customizing CP/M (for automatic command start-up), a review of CP/M utility packages, and the start of a series of tutorial articles on Pascal MT+ from Digital Research.

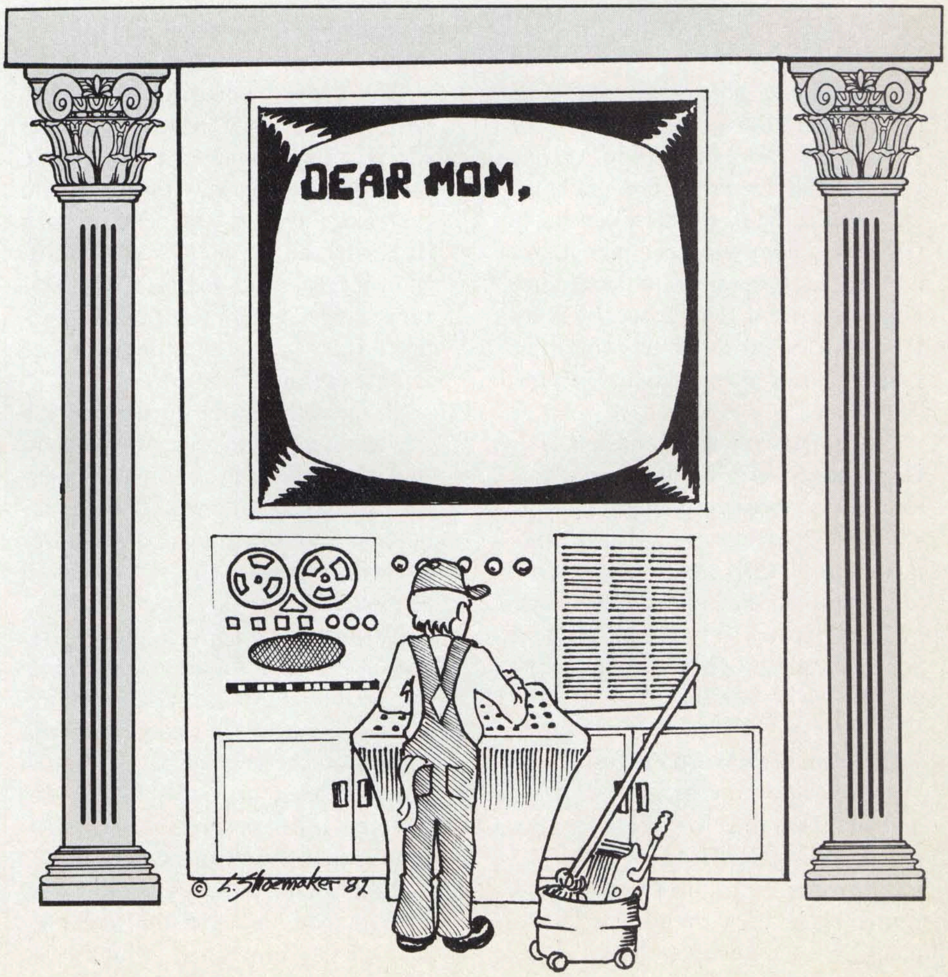
The following issue will introduce two popular data base management packages: FMS-80 and dBASE II. MailMerge will also be covered in an extensive tutorial and impatient user's guide.

User's Guide® will be exhibiting at the first conference to be devoted to the CP/M family of products.

CP/M '83, sponsored by Digital Research and produced by Northeast Expositions, will be the largest first year computer event ever, with more than 500 exhibitors and 25,000 attendees expected.

The three day show (January 21-23, 1983) will be held at the Moscone Convention Center in San Francisco, California and is open to CP/M users as well as the CP/M industry.

If you can attend, drop by our booth (#211) and say hello. For more information on CP/M '83, write to Northeast Expositions Inc., 824 Boylston St., Chestnut Hill, MA 02167, or call (617) 739-2000.



Writing, Editing, and Budgeting

Observations on Word Processing and Spreadsheet Calculating

We promise to provide in every issue an article that explains the issue's topics in everyday terms. This issue provides a tutorial on writing and editing with WordStar, and editing financial spreadsheets with SuperCalc; this article introduces both topics.

We promise not to bore you with details about these topics, nor to give a history of "word processing." What you probably need right now is a helping hand through the terminology, a few hints about what equipment you need to work magic with words and numbers, and a few observations on the use of microcomputers to write, edit, and draw up budgets and income statements.

We start with a description of a programmer's word processing activities. Many word processing programs started out as tools to aid programmers, *not* as tools for writers or editors. This is understandable, since microcomputers were used mostly by hobbyists and programmers in the industry's early years.

A Programmer's Word Processor

Watch any programmer at work, and you'll see fingers flying over keys and pounding the RETURN key. The programmer is most likely processing words. He or she is creating a "document" in a language such as Pascal, Fortran, C, PL/I, assembly language, etc. This "document" is called a *source* file.

The programming task involves constant word processing — typing and editing text. The text is comprised of expressions in the programming language. When it is completed, the text file is sent to a program called a *compiler* (or *assembler*), where it is transformed into a program that may or may not work properly.

What tools do programmers use to perform this kind of text editing? Many programmers prefer simple text editing programs that let them type one line at a time, ending each line with the RETURN key. WordStar incorporates many of the features programmers want in its "non-document" mode ("document" mode is most useful for text editing).

Programmers like to use the tab key to insert a *tab space* (equivalent to eight spaces) in their "non-documents," to keep columns of code in order and to show the logical structures of their programs. This is also known as the *fixed tab.*

Writers and other typists of typical documents like to use the *variable tab*, which lets you set tab stops anywhere on the screen (where they will appear on the printed page). A variable tab space is usually five spaces. Variable tabs are similar to typewriter tabs that can be set anywhere.

You can use either; however, "document mode" of WordStar (and other text editing programs) assumes you will use the variable tab, and "non-document mode" assumes you will use the fixed tab.

Programmers tend to use functions like "find and replace" often, since they are finding the names of data items and replacing the names with new names. Programmers never justify lines of code as you would justify lines of text to the right margin; therefore, "non-document mode" starts with justification turned off.

Programmers want fast output, so they tend to want to use fast printers such as line printers or dot-matrix printers. Readability is not a concern. As noted author and programmer Gerald M. Weinberg (*The Psychology of Computer Programming*) once pointed out:

> *Some years ago ... one heard much talk of the possibility of executives being able to read programs... Nobody can seriously have believed [this] ... even programmers do not read programs.*

It would seem that programmers need to use a different kind of text editing program than we would use to write a book or edit legal documents. A programmer needs no printing features other than the ability to print the text. A programmer needs no screen formatting, margin control, variable tabbing or hyphenation. A programmer needs no paragraph indents or spaces between lines.

Programmers can use features like

"find and replace," the ability to mark a block of text and move it or copy it to another file, the ability to use the same section of text in many different files, and the ability to keep track of different versions of the same program.

The programmer's word processor is a single-user microcomputer with several disk drives or a hard disk, a fast printer, and software to handle file archiving as well as programming tools (compilers, assemblers, debuggers, etc.). The program for text editing should be straightforward (but not necessarily simple), powerful (able to make text substitutions throughout the file and perhaps throughout many files at once), and quick.

Programmers expect complicated word processing programs to be hard to use for the task of writing programs, since they are overburdened with features never used in that task.

A Writer's Word Processor

There are no limits to the features desired by writers and editors. We want things that have not yet been implemented — a complete thesaurus at our fingertips, a *correcting* spelling checker (not one that just marks words it thinks are incorrect), a *correcting* homonym checker, a constant word counter, the ability to edit two files at once on a split screen... the list is endless.

At this moment you can buy (for $1795) a complete computer system that lets you run the most popular word processing program for writers and editors: WordStar. With the package comes MailMerge, a program that lets you compose form letters and print them with names and addresses from a separate mailing list.

This WordStar program lets you type and edit text, justify lines to the right margin, and change margins at any time and re-form the paragraphs. WordStar lets you move or copy blocks of text to another document, move or copy *columns* of text to other places in a document or to other documents, or insert "boilerplate" text into many documents at once.

WordStar has a variety of printing controls and special effects, including boldface printing, underlining, superscripts and subscripts, double-line spacing, whole paragraphs indented, headings and footings printed with each page, automatic page numbers, etc.

With such printing features it makes sense to use a "letter-quality" printer that prints fully formed characters. Some dot-matrix printers qualify as "letter-quality." All daisy-wheel and thimble-wheel printers are "letter-quality" as well, and most have all of the special effects, including *microspace justification.*

What is microspace justification? Typesetters use variable spacing between letters on a line to fill out the entire line to the right margin. WordStar and other text editing programs can control some daisy-wheel printers to print letters on a line with different size spacing between them, to make them appear to be justified as typeset copy.

When selecting a computer for word processing, select one that runs the software you need. Find a demonstration of the software and use it for awhile. Software is a considerable investment (WordStar lists for $495) — you do not want to buy software that is not suited to your needs.

Pay particular attention to the keyboard. You have to use it every day. Try touch-typing to see if the keys are in the right places. You may be surprised to find that some well-known computer manufacturers (notably IBM) have produced computers whose keyboards are criticized for having keys in the wrong places for touch-typists.

Keyboards vary in size, shape, feel and sturdiness. A keyboard must be strong enough to withstand your frenzied typing. Try pounding the RETURN key — a key that is perhaps used more than any other key, in any application — to see if it actually performs the way you want it to.

One person's favorite keyboard may not be yours. The latest keyboards are detached from the display units so that users can type from any angle, or even hold keyboards in their laps. The keyboard may also have a *numeric keypad* similar to keypads used for calculators. These keys supplement the numeric keys on the regular typewriter-style keyboard, and are provided for your convenience (for those who are used to calculators).

The best keyboard is usually one that includes *function keys* — special keys that activate specific commands in the word processing program. Many computers are now outfitted with such function keys for popular word processing programs (like WordStar and Spellbinder).

NOTE

Some computers supply function keys that must be programmed properly before they can be used. For example, our Alspa computer can be used with any terminal, and we purchased an ADDS Viewpoint (an inexpensive choice with a solid feel to the keyboard, which is detached from the display unit). However, the function keys on the ADDS Viewpoint do not activate WordStar functions. The only way to know if your keyboard's function keys work with the software is to *see a demonstration.*

Disk drives are a major concern for writers and editors. Ordinary text occupies more space than program instructions. To be productive, a writer must be able to write without too much interruption. An interruption such as the message DISK FULL may frighten or otherwise reduce the productivity of writers and editors who are novice computerists.

For this reason the Osborne portable computer has been criticized for its lack of adequate disk storage. One Osborne disk can hold a document of up to 15 pages during an edit session; however, most word processing programs need to reserve empty space on disk for a "scratchpad."

We use a single-drive Alspa computer for most of our article writing and editing. This computer can store over 500,000 characters on one double-density disk.

Default Settings

With all the features, word processing programs can be quite complicated. To ease the complications,

Continued on page 26

CP/M Tutorial...

BIOS, Files and the Directory

An Overview of CP/M Files, Directories and the Internal BIOS Module

by Tony Bove & Cheryl Rhodes

The human mind ordinarily operates at only ten per cent of its capacity — the rest is overhead for the operating system.
— Anonymous

Technical talk can be intimidating, especially when used by someone trying to explain what is wrong with your system. In many cases, the problem is not in the hardware, where it may be easily recognized — it is in the software, specifically the operating system's "modules" (sections) that control your hardware. Talk to CP/M specialists and you'll hear the words "Bye-oss" (BIOS) and "Bee-doss" (BDOS) spoken as if they were names of high-tech laboratories somewhere in Silicon Valley. "There's a trick you can do in the BIOS..." is a familiar opening to a typically incomprehensible technical discussion. What does it all mean? Many users can not comprehend why their systems are constructed the way they are, and how they work. However, a general knowledge of the inner workings of CP/M will benefit any users who need to find erased files, retrieve data from damaged disks, or "move" their system to make room for additional memory. This overly-simplistic explanation is more like a fairy tale, meant to take you by the hand through the jargon into a clearing where you can understand the internal organization of today's CP/M systems.

CP/M Internal Modules

Parts of CP/M were invented to satisfy different needs. Microcomputers were primitive at that time, and the micro hobbyists needed something to make their disk drives work with their homebrew computers. CP/M was one of the first programs written for microcomputers.

Programs were and still are largely unreadable, since they are not written in ordinary English. To understand a complex program, a programmer would often break it into sections, or *modules*, that contain the code to perform specific operations. Other programs could then be written to use these modules, which have to be written only once.

There were benefits and side-effects. Programmers could "hide" the details of an operation in a module, and make their programs more understandable (although the frequently used modules remained inscrutable). "High-level" languages like Pascal and BASIC could then be used on microcomputers.

CP/M was written in three modules: the BIOS, the BDOS, and the CCP. The first module (BIOS) knows how to handle the hardware. The second module knows how to manipulate files and data, and it knows how to properly use the BIOS. The third module (CCP) uses the BDOS to communicate with you, the user, at your screen and keyboard.

The CCP relies on the BDOS, and the BDOS relies on the BIOS module to send data to or from the hardware devices (disk drives, CRT screen, keyboard, printer, modem, etc.). Therefore, CP/M could theoretically run *any* computer's hardware, if the BIOS module knew how to handle the hardware.

Thus was CP/M designed to accommodate different hardware setups — different disk drives, different *consoles* (CRT screen and keyboard units), different printers, etc. The BIOS module was made simple enough to be customized.

The makers of CP/M did not provide the actual customized versions of CP/M. They simply provided a skeletal BIOS that could be customized by a programmer with access to the manuals and a knowledge of assembly language.

The BIOS Module

The BIOS is the heart of the system. This module was first designed to serve as a butler to a large house: directing the *input* and *output* in a primitive but essential way. This module can be used by any program to retrieve information from a floppy disk and display it on a CRT screen or print it on a teletype machine, or to store information on a disk.

CP/M is shipped from Digital Research (the creators of CP/M) to companies such as Zenith, Osborne, IBM and other computer manufacturers to be used with their computers. These companies customize the BIOS module to make it work with their proprietary hardware devices. The Digital Research version of BIOS works for an Intel MDS-800 computer system (a machine found in many software development labs).

Some computer manufacturers provide you with the *source code* of their customized BIOS module, in a file usually labeled CBIOS.ASM or something similar. The source code is useful to assembly language programmers who can edit the code as if it were an ordinary text file, and then *assemble* the code into a working BIOS module.

There are several ways to arrive at a customized BIOS that works in your system. The first is the easiest: purchase a system that is already working properly.

If something is wrong with your system, your dealer may be able to "patch" the customized BIOS to fix the problem, or provide an updated version of the system on a new system disk. You need only to use the SYSGEN program to transfer the updated version to your system disks. You may also need the MOVCPM program to change your system's internal memory size (discussed later).

Overview of Customizing the BIOS

This is not an attempt to show you how to customize your own BIOS. The Digital Research manual for CP/M (the chapter on the "System Interface") adequately explains how to customize the BIOS to readers who are assumed to know 8080 or Z80 assembly language. A future article in *User's Guide* will take adventurers through the step-by-step process of customizing a BIOS.

The rest of you can use this overview to understand what is going on, without too much information and without a knowledge of hexadecimal numbers.

Necessary tools to customize a BIOS include: an assembler, a debugger, and a running CP/M system or equivalent 8080 or Z80 system. ASM, an assembler, is supplied by Digital Research to run in a CP/M system; however, MAC, the macro-assembler from Digital Research, is preferred by programmers.

From the Ground Up

To make CP/M work on a computer for the first time, the programmer must use assembly language to write a simple memory loader routine called GETSYS. This program has to be able to read the first two tracks of the distributed CP/M disk. The programmer must also write a PUTSYS routine, the reverse of GETSYS: to put the system on the first two tracks of another disk. This second disk can be in a format other than the eight-inch single-sided single-density distribution disk.

With a GETSYS and PUTSYS routine (skeletal versions are provided in the appendix of the CP/M manual), the programmer can load the CP/M system into the new computer's memory. This distributed system is configured to be a 20K system that runs programs that are up to 20K in size.

The programmer must then write a new BIOS module, using as a reference the skeletal BIOS module called CBIOS which is provided in the appendix of the manual. The programmer should call the new customized BIOS by the name CBIOS.

The skeletal CBIOS should be able to perform data input from the keyboard, data output to the screen, and data input/output to and from the disk drives. Primitive routines to use one disk drive and a simple console (keyboard/screen) are sufficient at this stage.

The programmer must test these new modules completely, using a debugging program (DDT is supplied for free by Digital Research, but SID, also from Digital Research, is preferable).

When GETSYS, PUTSYS and CBIOS are ready, the programmer uses GETSYS to read the distributed version of CP/M into memory. Using DDT or a similar debugging program, the programmer "patches" the version in memory to contain the new CBIOS in place of the distributed BIOS. The programmer then uses PUTSYS to put the customized version of the system onto the first two tracks of a new disk. The original CP/M disk must not be disturbed. Keep it in a safe place and use only a copy of it.

Using GETSYS again, the programmer can bring the newly customized version back into memory. This version should now be a working CP/M system that only needs a "bootstrap loader" to be on its own feet. The programmer can test this version by using the SAVE and DIR commands.

The programmer can now write a "bootstrap loader" that is similar to the GETSYS routine, but is more efficient and performs more "system housekeeping" duties that are peculiar to the particular hardware environment. The programmer can use PUTSYS to put this "bootstrap loader" on track zero, sector one, of the new disk; or, alternatively, the programmer can locate this "bootstrap loader" in a PROM (programmable read-only memory) device.

Computer manufacturers can take the code of this "bootstrap loader" and implement a ROM (read-only memory) device for their computers that automatically "boots" CP/M.

The term "boot" implies kicking CP/M by the seat of its pants. Actually, the term "bootstrapping" means "pulling oneself up by one's bootstraps," which seems like an impossible thing to do. Computers can start themselves in this manner: by starting a routine (the "bootstrap loader"), which starts more powerful routines (the CP/M initialization routines).

Customizing a Running System

A running system and the SYSGEN, MOVCPM and DDT utilities make customization a bit easier.

If you are altering CP/M for your system, and a version of CP/M is already running in your system, you can use MOVCPM to bring the CP/M system into the memory space usually used by your application programs (the TPA, or *transient program area*).

With the image of the CP/M system in the program space, you can use the SAVE command to save it in a file, and alter it using the DDT debugging utility. We would suggest that you not try this unless you are given step-by-step instructions (you can find such instructions in several books on CP/M, and in Digital Research's CP/M manual, in the section called the "Alteration Guide").

The MOVCPM utility program is the easiest way to bring the CP/M BIOS, BDOS and CCP into the transient program area (TPA) for debugging and "patching" (altering contents of specific memory locations).

The MOVCPM utility also "re-configures" CP/M for a different memory size. CP/M must be able to manage a program area (TPA) of a certain size for application programs. Many programs need over 48K; therefore, most CP/M systems are configured to manage 50K, 52K, 56K, 60K, or 64K. This is not the amount of memory available to the application program — this amount is the *total memory size* to be occupied by CP/M and the application program. For example, a 64K CP/M system can usually handle programs that require 60K of program space (TPA).

MOVCPM can take several forms:

MOVCPM nn *↵

In this form, MOVCPM places an image of the system in your program space (TPA), adjusting the system image to manage the amount of memory, in kilobytes, that you specify for ***nn***.

MOVCPM * *↵

In this form, MOVCPM places an image of the system in your program space (TPA) according to the total amount of RAM (read-write memory) available; that is, the largest CP/M possible for your system. Some systems (notably the Osborne computer) will malfunction if you use this form, because some of the "available" RAM is not really available to CP/M (it's used for other things, such as controlling video display).

MOVCPM nn↵

In this form, MOVCPM constructs a system for the memory size ***nn***K, and starts running the system (this form does not let you save the reconstructed image).

MOVCPM *↵
or
MOVCPM↵

In this form, MOVCPM constructs a system that can manage *all* available RAM (read-write memory), and starts running the system (this form does not let you save the reconstructed image). Some systems (notably the Osborne computer) will malfunction if you use this form, because some of the "available" RAM is not really available to CP/M (it's used for other things, such as controlling video display).

MOVCPM is used to move an image of CP/M into the TPA where it can be saved in a file on disk with the SAVE command, or saved in the system tracks of a disk for "booting" from that disk.

For example, to place a 32K image of CP/M in the TPA, type this command:

```
A>MOVCPM 32 *↵
```

The MOVCPM utility displays the following message:

```
CONSTRUCTING 32K CP/M VERS x.y
READY FOR "SYSGEN" OR
"SAVE 34 CPM32.COM"
```

As the message suggests, the new 32K version of CP/M is in the program area ready for your next operation, which should be either a SYSGEN (to place a copy on the system tracks of a disk, to "boot" the system from that disk) or a SAVE (to save a copy in a file for modification).

You should SAVE the system image if you intend to modify it or debug it. You should use SYSGEN to store a system image on a disk only when the system image is ready for use.

NOTE

To reconfigure the Osborne version of CP/M, *do not* use the forms of MOVCPM that construct an image based on "all available memory." Osborne computers use the top part of RAM for the video display. The largest size you can specify for the Osborne version of CP/M is 60K (***MOVCPM 60↵*** or ***MOVCPM 60 *↵***).

To SAVE the image of CP/M in a disk file, type the following command:

```
A>SAVE nn CPMxx.COM↵
```

The values to supply for ***nn*** and ***xx*** are displayed by MOVCPM in its message, **READY FOR "SYSGEN" OR "SAVE nn CPMxx.COM"**, which is displayed after using MOVCPM to place an image of CP/M into the program area (TPA).

After saving the image in a ".COM" file, you can use the DDT or SID utility program to load the image into memory and make modifications to the BIOS portion of the system.

It should go without saying that you should not be modifying the BIOS of your system, or *any* part of your system, without a knowledge of assembly language *and* a knowledge of the standard BIOS. It is possible for a novice to make changes, or "patch" the system with new values for memory locations, if the novice follows explicit directions supplied by someone who knows how to make BIOS modifications.

After making modifications and testing the image of CP/M using DDT or SID, you can save the newly-modified version on the system tracks of a disk using SYSGEN.

To use SYSGEN, simply type the command:

```
A⟩SYSGEN↵
```

The program responds with:

```
SOURCE DRIVE NAME (OR RETURN TO SKIP):
```

If your system image is in memory (which it should be if you just performed a MOVCPM command, or used DDT to modify a version of CP/M), press RETURN to this question. Do not type a source drive name, since that answer will load the version of CP/M stored on the system tracks of your system disk. A RETURN, by itself, skips this question and tells SYSGEN to use the image stored in the program area (TPA):

```
SOURCE DRIVE NAME (OR RETURN TO SKIP):↵
DESTINATION DRIVE NAME (OR RETURN TO RE-
BOOT):
```

Type the drive of the disk to receive the newly-modified version of the system. SYSGEN places the system image on the system tracks of the disk. If you've modified the system so that it is much larger, or for some reason cannot be located on the system tracks (track 0 and 1) of the disk, you cannot use SYSGEN unless you modify SYSGEN itself, or write your own PUTSYS routine (as described previously in "From The Ground Up").

With your newly-modified version of CP/M stored on the system tracks of a disk, you can test its ability to "boot" the system by using it as the system disk. If it works properly, you can copy the system image to other disks by using normal SYSGEN operations, specifying ***A*** or whatever drive holds the disk containing the new system.

Summary: BIOS Modification

Don't try it unless you know how to use assembly language and you understand Digital Research's BIOS module as described in the Digital Research manual ("Alteration Guide").

If you need to configure CP/M for a computer that is not currently running CP/M, you will need to modify the system "from the ground up."

If CP/M is currently running in your system, and you are modifying it for another terminal, or patching it to handle other devices, or customizing it for your system, you can use MOVCPM to bring the image of CP/M into memory, and SAVE to save it in a disk file. You can then debug the saved file with DDT or SID (both available from Digital Research, and DDT is supplied with most systems).

After testing the modified version and making sure that it works properly, use SYSGEN to copy the system image to the first two tracks of a disk, to make it a system disk. If your version of CP/M will not fit on two tracks, or if your disk is non-standard, you may have to write a PUTSYS routine as described in the Digital Research manual. You may also have to code a more complicated "boot" routine than the one supplied, in order to load your version of CP/M from a system disk.

This overview is nothing more than an overview; it is not intended to provide step-by-step instructions on modifying your BIOS. With this overview you can confidently discuss the situation with any CP/M programmer. However, don't be surprised if you still can't understand the programmer!

Files and the Directory

CP/M stores information and program instructions in *files* for which you provide filenames. These filenames are stored in a *directory* of filenames that can be readily scanned by CP/M. CP/M finds a file by its name, and although it may sound easy, this file-finding mission is quite complicated.

Why would you want to know how CP/M finds a file? For several reasons: what if CP/M can't find your important data file, and keeps repeating something about a bad sector? What if you accidently erased a file, and wanted to recover it?

These two situations can be solved with a program such as Disk Doctor (described in this issue) or DUU.COM (a public domain program available for free from remote CP/M systems and user's groups). However, in using both programs, serious problems require use of instructions that assume you know something about the CP/M *file structure* and the structure of *directory entries*.

Bits, Bytes and Hexadecimal Numbers

The smallest measurement of data is the *bit* that can have the value of one or zero (binary number system). A small manageable unit of data is called a *byte*, and usually consists of eight bits (in an eight-bit computer). Bytes are numbered using the hexadecimal numbering system.

An *address* in memory is expressed as a four-digit hexadecimal number such as 0100H or 1FC0H. The *contents* of a byte of memory can be expressed as a two-digit hexadecimal number.

File Records and Allocation Groups

CP/M organizes bytes into logical units called *records*. A CP/M record is 128 bytes (sometimes called a *sector* because single-density disks contain information in 128-byte sectors). A file can contain up to 65536 records, or approximately eight megabytes (8Mb). CP/M lets you specify a record in a program by its number, and read or write that specific record, while CP/M handles the disk access and data transfer.

A standard eight-inch single-density single-sided CP/M floppy disk can store 250K bytes ("K" equals 1024 bytes, so "250K" is 256,000 bytes). This storage space is divided into

2002 sectors on a disk (26 sectors per track, with 77 tracks). To create new space for files as they expand, CP/M finds eight sectors at a time — an *allocation group* — and stores eight records in this area of the disk (1024, or "1K" bytes).

The allocation groups for one file are not necessarily contiguous (next to each other). Each time CP/M needs more disk space to write more records into, it finds an unused or recently "deleted" allocation group and re-uses it. CP/M can find all of the groups allocated for one file using file control and access data stored in the *directory* on the disk.

CP/M will allocate an eight-record group even if it has to store only one more record, and the other seven are unused but allocated to the file. However, a PIP operation may make a complete copy of a file with one less allocation block because, in one operation, PIP can organize the data into new groups and use space more efficiently.

The STAT command displays the file size in 1K increments — the number of allocation groups. Most customized DIR displays (XDIR.COM, SD.COM and others) also display file sizes in 1K increments (the number of allocation groups, holding 1024 bytes each).

Extents and the Directory

Allocation groups would be hard to find on disk, if CP/M did not refer to sets of allocation groups as *extents*. One extent contains 128 records (16384 bytes). The disk directory contains an entry for each extent, and this entry holds information about how to find allocation groups on disk.

CP/M finds a file's record by dividing the record number by 128 to find the number of the extent. With the extent number, CP/M finds the directory entry for that extent, and uses the directory information to find the record's allocation group.

Although a file will have more than one directory entry if it occupies more than one extent, only one name appears in a DIR or STAT display of directory names. The file size information also summarizes the amount of space taken up by all extents of the file.

File Control Block

When your program searches for a file, it uses data in a *file control block* CP/M creates in memory for the purposes of finding the file and accessing its records. This file control block, or FCB, contains data supplied by your program: a filename and possibly the number of the record your program is seeking. It also contains a lot of empty spaces that are meant to hold information used to find allocation groups within one extent.

A nearly-empty file control block is created whenever your program opens an existing file or makes a new file.

Each disk directory entry is formatted to look like a file control block. CP/M reads the directory looking for an entry with a filename that matches the filename in the file control block. When CP/M finds the appropriate entry for the filename and the extent, it copies the directory entry information to the file control block.

This information occupies 36 bytes in CP/M version 2.0 and newer, and occupies 33 bytes in older CP/M versions. The file control block is shown in figure 1.

When you specify a filename for a program, field A (byte zero) in the file control block (figure 1) contains a zero for the currently logged disk, or the value 1H for drive A, 2H for drive B, etc.

Field A in the directory entry contains a zero or other value if the file is active (not erased). This field contains a zero if the user area for the file is user area 0 (most CP/M systems without hard disks use area 0 as the user area for all files); otherwise, the field contains the number of the user area (up to 15 decimal, or F in hexadecimal).

To erase a file, CP/M changes this field to the value E5 hexadecimal. To "un-erase" a file, you can use a disk editing program to change this field from E5H to 00H (zero).

Field B and C in the file control block must match field B

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Field	A	B	C	D	E	F	G	H	I
hex	00	53 49 44 20 20 20 20 20	43 4F 4D	00	00 00	3A	33 34 35 36 37 38 39 3A 00 00 00 00 00 00 00 00	01	00 01 00
byte	0	1 5	10			15	20 25 30		35

Field	Byte	Description (contents in hexadecimal numbers)
A	0	FCB — drive number to access: 00 = access the currently logged disk 01 = access drive A 02 = access drive B . . . 0F = access drive P Directory entry -- user number, or erase flag 00 = an "active" file E5 = an "erased" file any other number is a user area number
B	1-8	Primary filename, padded with blanks
C	9-11	Filename extension (file type), padded with blanks
D	12	FCB: calculated extent number based on desired record Directory entry: extent number for this entry
E	13-14	File size in number of sectors (128-byte records)
F	15	Number of 128-byte records in the current extent
G	16-31	Map of allocation groups on disk for this extent (each group is 1024 bytes)
H	32	Next record to be read or written (under version 2.0 and newer, this applies only to sequential access)
I	33-35	Random access record number (version 2.0 and newer)

Figure 1. *The file control block (FCB) and directory entry use the same layout (data structure).*

and C in the directory entry — the filename and filename extension, or "file type." Field D contains the number of the extent, which is based on the record number your program supplies with the instruction to read the file.

Other fields in the file control block may be empty until CP/M finds the directory entry for the extent to be read. CP/M copies the contents of field G (the allocation group map) to the file control block in memory. CP/M then uses that information to find the allocation group holding the desired sector.

During file access, CP/M updates the information in the fields of the file control block to accommodate newly-added records to the file or newly-erased records. As the file grows or shrinks, or is updated, the file control block information changes to reflect the file's new size.

When your program *closes* the file, CP/M copies the new information in the file control block to the directory entry, replacing the old directory entry information. *If your program performs any "writes" to the file, it must also close the file* to copy the new file control block information to the directory entry.

Summary: Files and the Directory

You are now armed with the "buzzwords" used in describing file and directory access.

You know that each file is comprised of 128-byte records, which are stored within eight-record allocation groups on the disk. CP/M organizes these groups into extents, and finds groups within an extent by locating the directory entry for each extent in the file and using the directory entry's allocation group map.

CP/M copies the directory entry information into its file control block in RAM. Using this information, CP/M finds specific records on disk. After writing data records to a file, CP/M programs issue the "close" command to close the file. When this happens, CP/M also copies the file control block information to the directory entry for that extent, replacing the old directory entry contents.

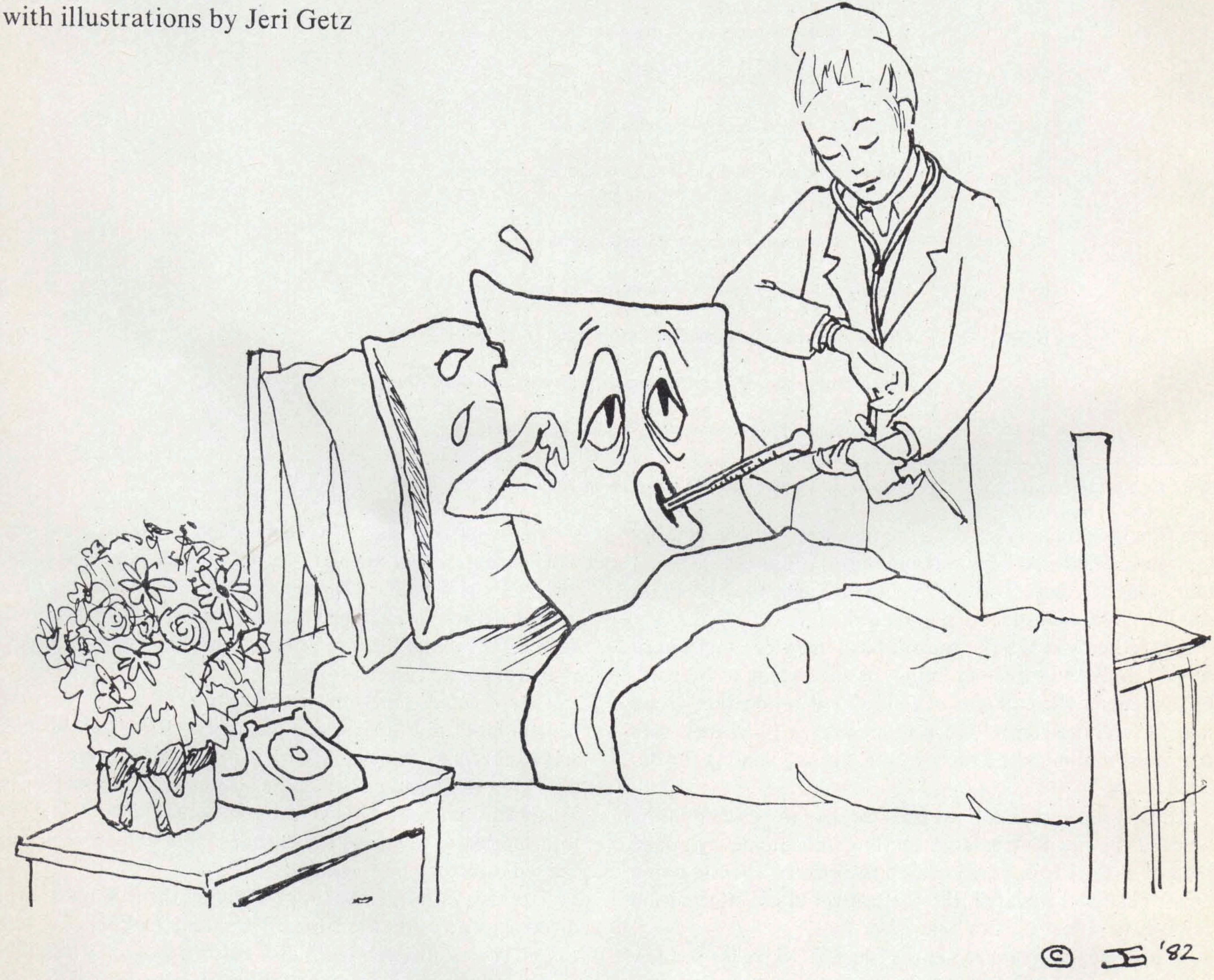
To erase a file, CP/M simply changes the first byte of the directory entry for the file's first extent to E5H. To "unerase" such a file, you use a disk editing program to change this byte to zero, to make the file an "active" file again.

This has been a overly-simplistic introduction to CP/M file access. We hope you don't rely solely on this information to perform disk edits, to recover erased or damaged files, or to modify file control blocks. This information is intended to act as an introduction to the Digital Research manuals. If you are an assembly language programmer, or if you wish to become one, dive right into the Digital Research manuals, and good luck!

Disk Doctor: The ℞ For Bad Disks

Recovering files and directories from "crashed" disks

by Edgar F. Coudal
with illustrations by Jeri Getz



Crashed a vital disk? Nothing coming up but BDOS errors? Are your backup disks are either hopelessly out-of-date, or worse yet, nonexistent?

Then it's time to call the Disk Doctor, a disk utility from Supersoft Inc., of Champaign, IL. Also, to make sure the "Doctor's" work will not be in vain as a result of a hardware error in your system, you might also consider calling in Diagnostics II from the same company.

Disk Doctor and Diagnostics II are software utility packages that run under the CP/M environment. The "Doctor" recovers data from accidently erased files on disks (including disks with all files erased), and recovers files from disks with damaged directories. Disk Doctor requires a minimum 48K CP/M system with two disk drives. If you have a single drive system, you can use Ward E of Disk Doctor to read the names of erased files on your floppy disk, but you cannot recover the erased files, because Disk Doctor's "recovery" wards (A, B, C and D) require two disk drives to operate.

Diagnostics II, requiring at minimum a 32K CP/M system, applies stringent tests to the hardware in your system to determine if it is functioning properly. The two software packages are part of Supersoft's system maintenance series.

These programs are popular with computer manufacturers and OEMs (original equipment manufacturers and packagers). This issue of *The User's Guide* focuses on Disk Doctor. Diagnostics II will be covered in a future issue.

Disk Doctor's Wards

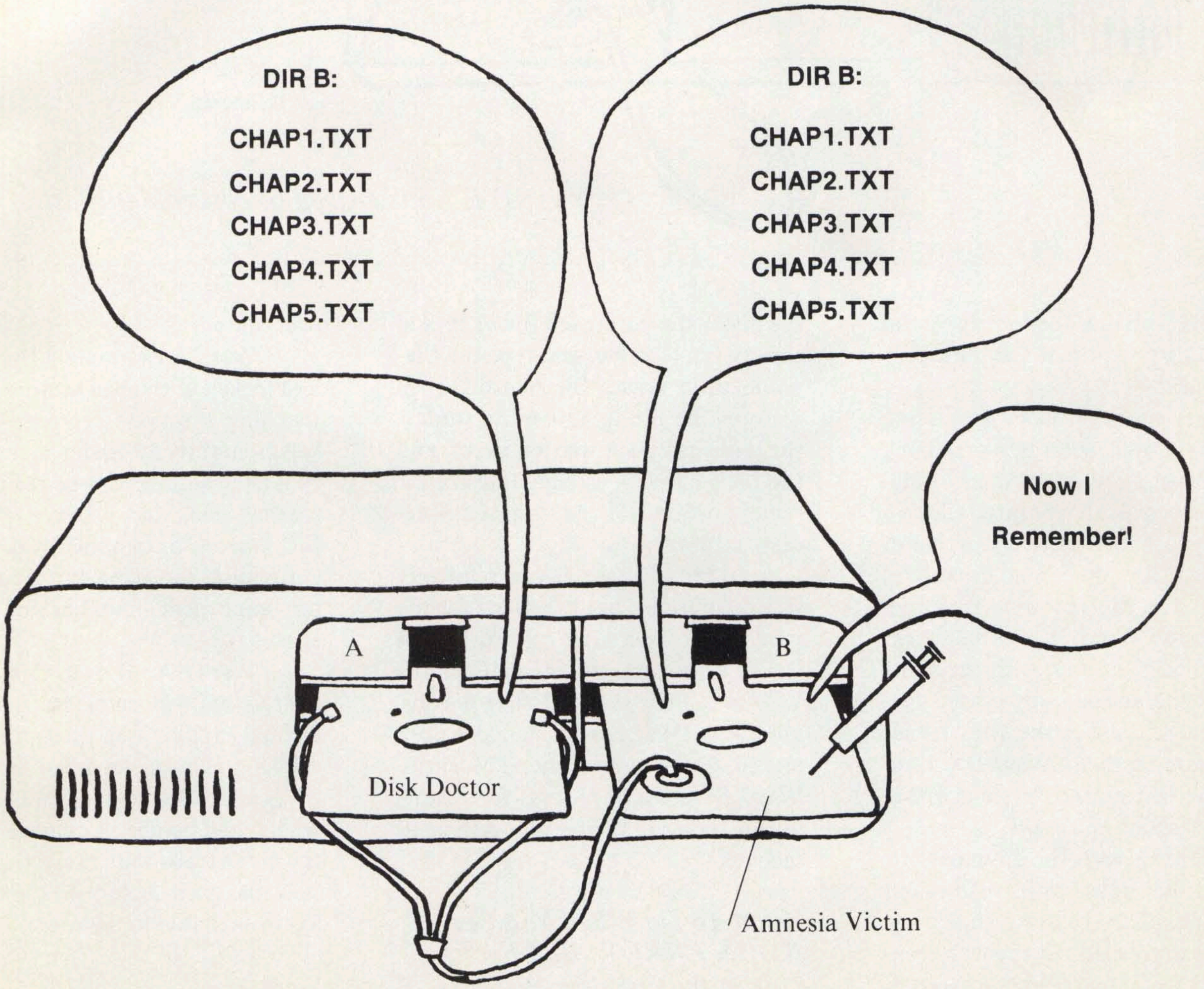
The five "Wards" of Disk Doctor — five separate routines on the disk which can be called up, depending on the problem — provide a variety of different medicines to deal with differing disk ailments.

The routines do not require any technical knowledge of the CP/M file structure. If you are running programs under CP/M, you can run Disk Doctor by following the menu-driven, self-prompting format which displays key information.

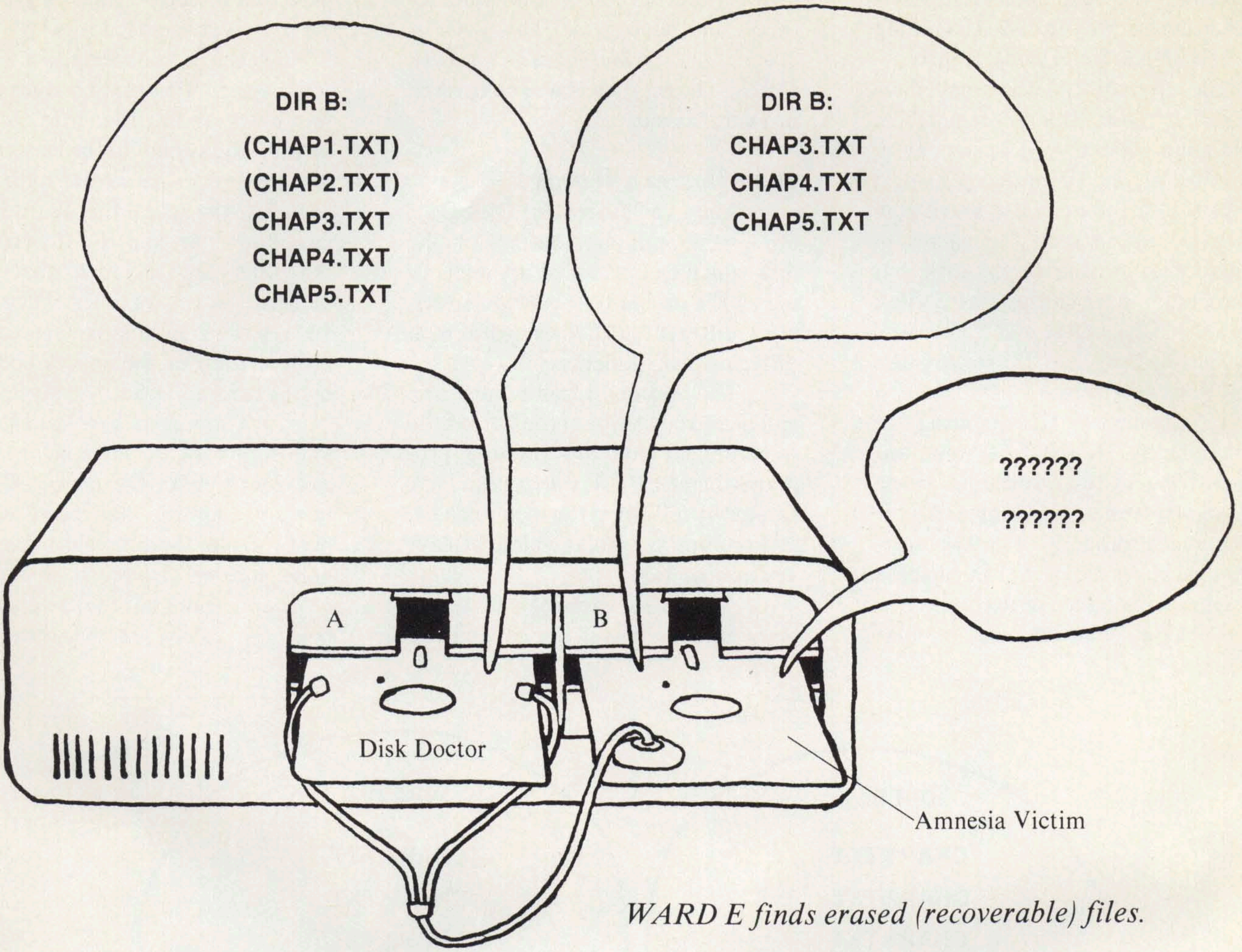
A look at each of the wards gives an overview of the capabilities of the program. Ward E simply displays the directory, including entries for recoverable erased files.

When CP/M erases a file, it sets a special flag that changes only a few bytes of the file, to effectively "blind" the system to the existence of the file. It does not go out to the disk and erase the actual file. Ward E puts parentheses around the filenames in the directory of files that were "erased" in this manner. These files are recoverable if new data has not been written in the spaces occupied by the "erased" files.

It's amazing how much data, long forgotten, remains on the average user's disk. Obviously, if some new information has been written over the old, then the old material is gone forever. However, if no disk write operations have taken place, the data is easily recoverable, even



WARD D recovers erased files.



WARD E finds erased (recoverable) files.

though its filename does not appear in the directory listing of CP/M's DIR command.

The main reason for using Ward E of Disk Doctor is in preparing to use Ward D, whose primary function is to recover those erased files. In fact, if you know the exact name of the erased file, you can go directly to Ward D for the recovery function. Before using Ward D, you *must rename* any files on disk with the same name as the accidentally erased file. If you merely *erase* the files rather than renaming them, Ward D will recover the last erased version, rather than the version you want.

Ward D reads the directory of a disk and then rewrites it, with minor changes, back to the disk. Thus it operates as an erased file recovery routine and as a fast directory repair routine.

Ward D asks the user to place the disk with the erased file or files in the "patient" drive, and type the filename of the erased file. Ward D then restores the file to active use (unless the data has been written over), and the file's name pops back into the directory where CP/M can again access the data.

Wards D and E are relatively simple routines, but lifesavers for the user who perhaps typed ***ERA *.TXT***↩ to get rid of an OLDFILE.TXT, then realized that a valuable GOODFILE.TXT had also been erased at the same time. The entire Ward D recovery process for restoring an "erased" file takes less than 30 seconds.

What To Do When You Get BDOS ERROR: Bad Sector

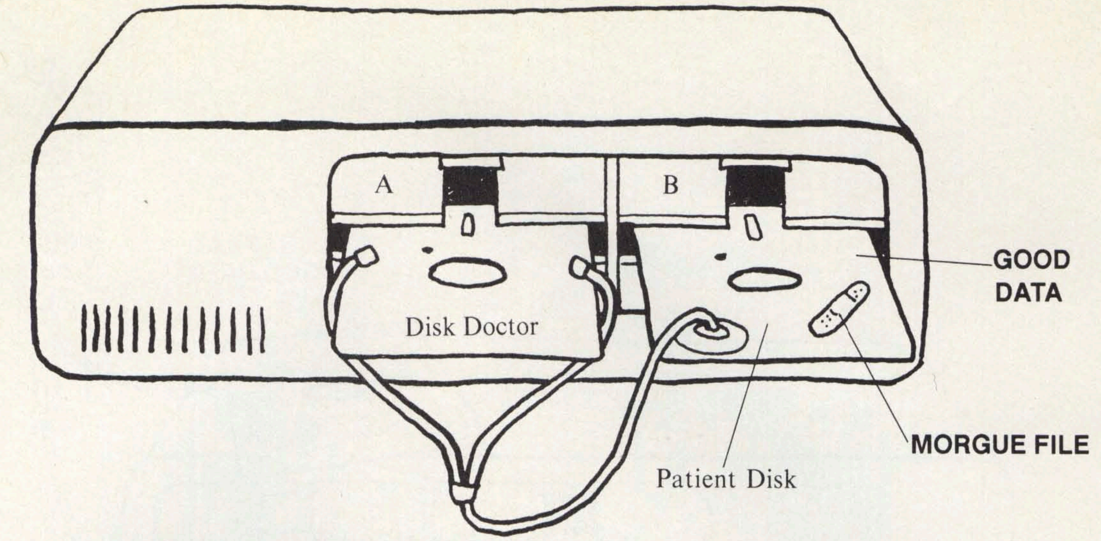
In the first three Wards (A, B and C), Disk Doctor gets down to some heavy work. To summarize and over-simplify:

Ward A examines a floppy disk and locks out the bad sectors without touching the good sectors. Ward B copies selectively, under manual user control, whatever can be read from a crashed disk, and places it in a new file. Ward C automatically copies the entire disk, replacing bad sectors with an equivalent number of empty spaces.

Wards A, B and C avoid the CP/M built-in error traps. During normal application program operations, when you get a bad sector on a disk, a BDOS error occurs and the whole disk bombs. By circumventing the error traps that cause that situation, the good sectors on the disk are again available to the user.

Ward A

Before running Ward A on a "patient" disk (one with a bad sec-



WARD A tests new disks for damage and patches damaged disks until they can be copied by WARD C or B.

tor), you should run Ward D to recover any erased files. Once you run Ward A, you will not be able to recover any previously erased files.

If there are any .$$$ "temporary" files on the "patient" disk, you must use CP/M's ERA command to erase them before using Ward A. As part of their error recovery attempts, many programs create temporary files with the .$$$ extension when they try to read or write to a bad disk sector. Ward A will not find any bad sectors associated with a .$$$ file, since it assumes them to be part of the .$$$ file. Do not attempt to run Ward A until you have erased any .$$$ temporary files from the patient disk.

Ward A reads through the "patient" disk (default drive B), looking into every sector 10 times, just as CP/M does, in attempts to read each sector. After 10 failures in its attempts to read a sector, Ward A opens a file called "MORGUE" and allocates the group of sectors containing the bad sector to that file. Then it goes on to the next sector.

Since CP/M will never allocate a sector that is already in a file, the system will never try to access the bad sectors that now make up the file "MORGUE." You should have no reason to read or write to a MORGUE file, either. If you erase a MORGUE file, the bad sectors will again be accessible by CP/M. Since erasing a MORGUE file un-does what Ward A does, you should never erase a MORGUE file. The documentation for Disk Doctor says the bad sectors will "return to haunt you" if you erase any MORGUE files.

Ward A is truly a test of the integrity of the diskette media. It has nothing to do with the data on the disk. However, if you're going to start some important and lengthy development work, or if you have a disk that's going to be in constant use, like an inventory record or payroll information, you'd probably want to run Ward A to insure that your disk is good throughout, and that any dubious sectors will be isolated from the rest of your programs.

Ward A is worth running a few times on a newly formatted disk that is to be used for important work, because after it has been run a few times (creating the files MORGUE.NO1, MORGUE.NO2, etc.), Ward A reveals how reliable the media is. An error prone disk will create a large MORGUE file each time you run Ward A.

Ward C

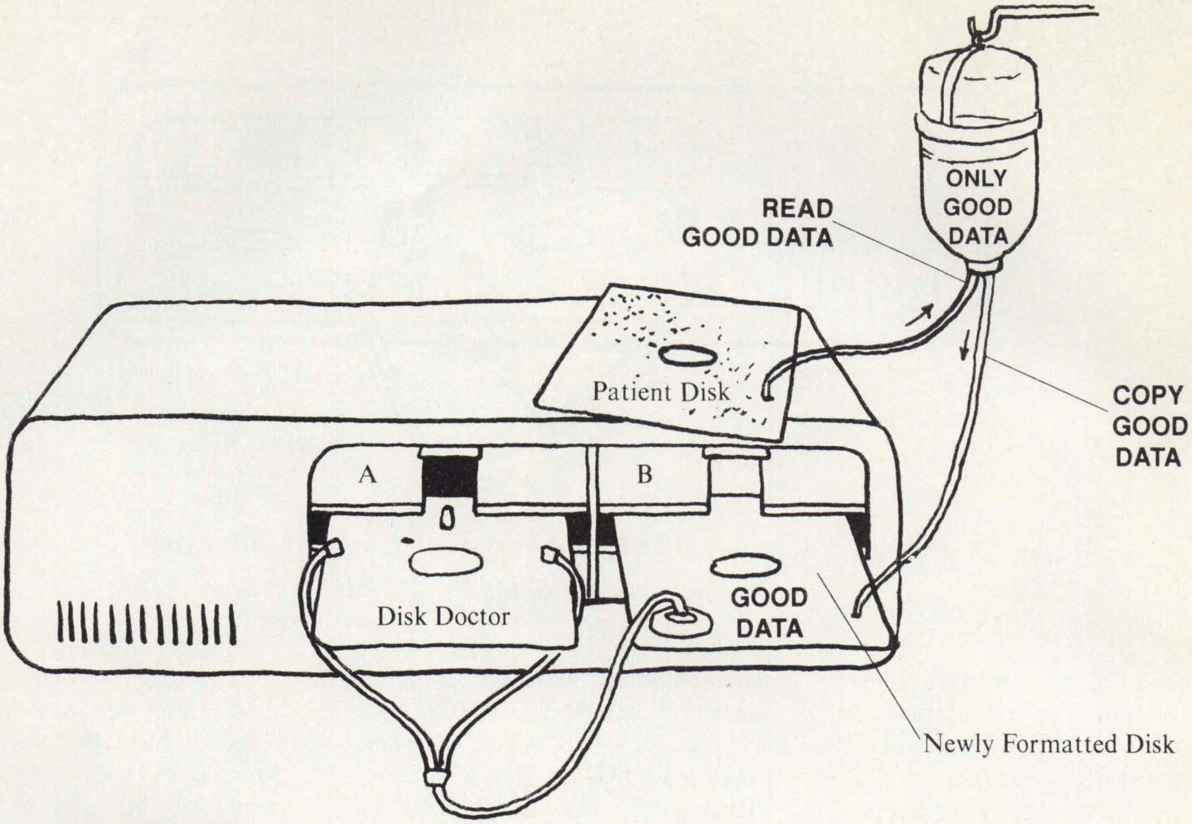
Ward C is similar to Ward A, except that it deals with the actual data on the disk. It copies only good sectors of a disk (ignoring the bad sectors) onto a second disk. The user places the crashed disk in drive B, and a freshly formatted disk in drive A. Ward C will copy every sector it can read to the new disk. When it comes to a bad sector (one that it can't read after 10 tries), it fills the corresponding sector on the fresh disk with empty space.

Ward C is a particularly useful routine for disks full of data, which don't have room for a MORGUE file. The Ward C operation is a disk-to-disk copy routine that can take from 10 minutes to an hour, depending on the number of bad sectors on the disk and the disk drive characteristics.

Ward B

Ward B is the only Ward in the Disk Doctor hospital that demands any knowledge of the CP/M operating system and how it works. It is similar to Ward C, in that it locks out the bad sectors and copies the good, except that it does it all under manual control from the keyboard, rather than automatically.

To use Ward B, the bad disk is inserted into drive B and a good disk is inserted in drive A. The user is asked to type a filename and the program allocates space for the file on the good disk. The program then asks if the user wants to save by logical groups, (those sectors allocated to a



WARD C automatically copies good data from a bad disk to a good disk.

file name), or by physical sectors. The user is prompted through other steps in the process, such as furnishing the logical group number, or the sector parameters.

If the user specifies a bad sector, Ward B will refuse to copy it. The biggest and most important use for Ward B is in recovery of programs from disks where the directory file control block itself has been damaged.

By ignoring all the allocated sectors that can be identified from whatever directory blocks are still intact, the remaining sectors and groups can be copied into a new file, then examined, and finally refined and brought back to access and use, despite the absence of a disk directory. If the file to be recovered is very large, it can be recovered as several small files by running Ward B over again until all pieces have been recovered. CP/M's PIP command can then be used to concatenate (link) the files into one file on the new disk.

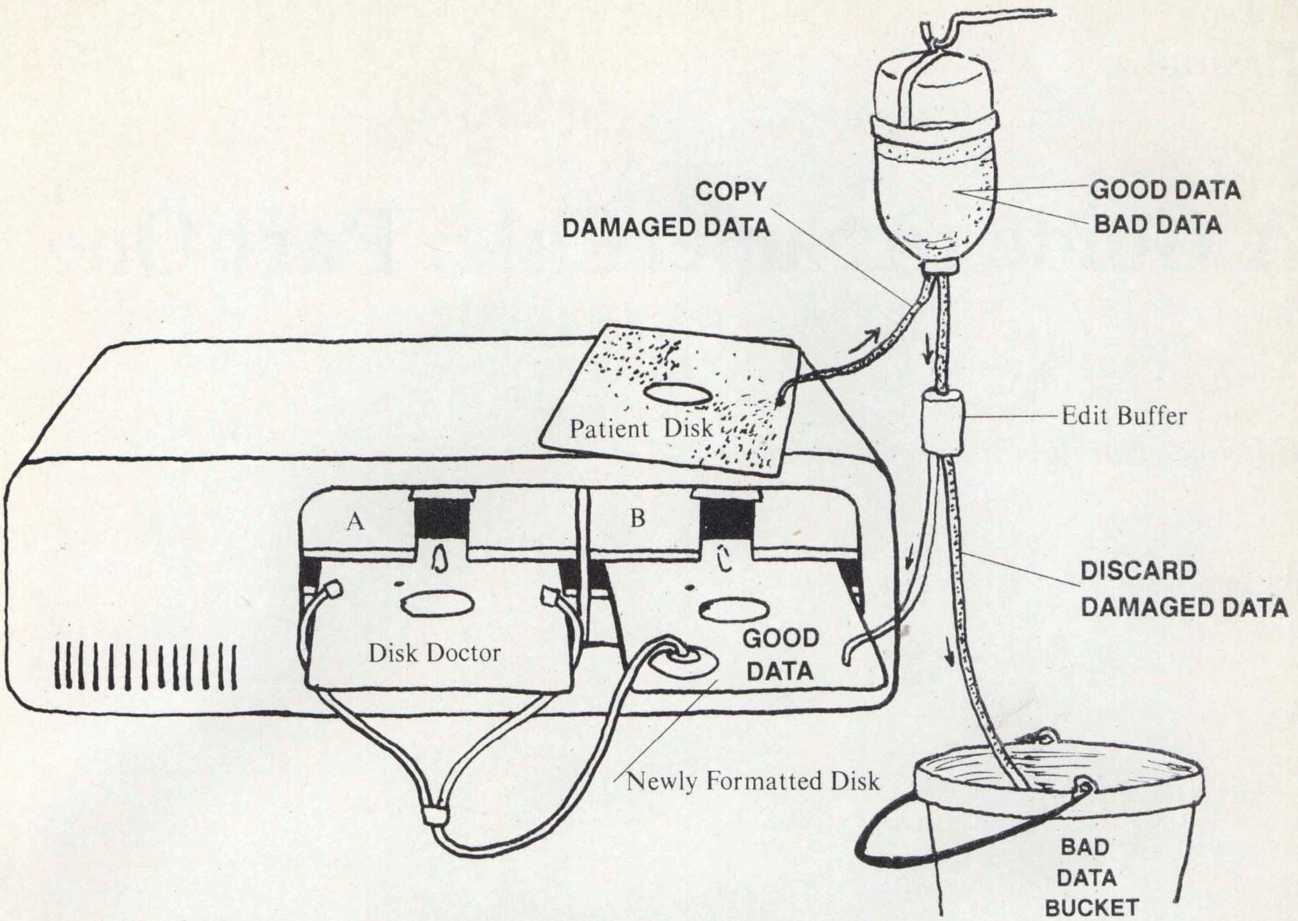
ASCII Files vs. Binary Files

An ASCII file is one that contains text or the source code of a program. You can use any text editing or word processing program to access the data in an ASCII file and change it or add to it. Some ASCII data base files cannot be modified or edited, but most are still useful even if a sector of data is missing.

Disk Doctor can "un-erase" any file, or recover it sector by sector. The utility can "un-erase" executable programs and other binary or object files, but sector-by-sector recovery is not useful with executable, binary or object files (such as files with the ".COM", ".OBJ" or ".HEX" extensions). These files are virtually impossible to read and reconstruct once a sector is missing.

If you lose a sector out of your great American novel or other text file (written with a text editor or word processor such as ED or WordStar), it's pretty simple to replace that lost paragraph. However, if you lose a sector out of the middle of an executable file (a binary, object or compiled file), especially a .COM file, there's no way to even key the material back in from the keyboard.

For example, if you have a CBASIC source file (a program listing before compilation), it is fairly easy to reconstruct any missing code by retyping it. The CBASIC object (compiled) file will not run if it is missing a section of code, and you cannot reconstruct the missing code. After you retype any missing code,



WARD B offers selective copy of good data from a bad disk to a good disk with an editing feature that allows reconstruction of damaged files.

the CBASIC source file can be compiled, and the resulting newly-compiled object file will run.

Summary

Supersoft notes that proper installation of the program to fit the user's hardware configuration is vital (there are versions already installed for specific machines such as the Osborne 01 portable computer).

While the installation procedure is self-prompting, it does need information on such drive characteristics as low and high sector numbers, sectors per track, number of tracks per disk, and a couple of other hardware parameters. Once properly installed, the program needs no further system information. Ward B can be used to test your Disk Doctor installation (see the manual for details).

Remember, you can't use most of the features of Disk Doctor if you have a single drive system, since the recovery wards of Disk Doctor requires a minimum of two floppy disk drives.

The twenty-six page manual accompanying is direct and clear, with hardware information in an appended table to help with the installation of the program. According to SuperSoft, users are welcome to call the Supersoft hotline and be talked through the one-time installation.

Disk Doctor requires a 48K CP/M system, with two drives for complete operation. The cost is $100 (manual alone, $10).

If you are an ISV (Independent Software Vendor), call or write Peggy Anderson at P. O. Box 579, Pacific Grove, CA 93950, (408) 649-3896 for information on the ISV seminar scheduled (following CP/M '83) January 24-28, 1983 in Pacific Grove.

User's Guide will be exhibiting at booth # 51 in March of 1983 at the 8th West Coast Computer Faire. The West Coast Computer Faire is held in San Francisco's Civic Auditorium and Brooks Hall from March 18 to March 20, 1983. If you're in San Francisco at that time, stop by and visit. Write to Computer Faire at 333 Swett Road, Woodside, CA 94062, for more information.

A Guide to SuperCalc: Part One

Editing a Sample Balance Statement

By Tony Bove & Cheryl Rhodes

In this article we use the ↑ (up-arrow) symbol to stand for the Control key on your keyboard (sometimes labeled CTRL, CNTL or ALT), and we use the ⊃ symbol to stand for the RETURN key (sometimes labeled CR, RET or ENTER). We use ***THIS FACE*** to show what you should type, and **THIS FACE** to show what appears on your system display.

SuperCalc®, from SORCIM Corp., is a popular spreadsheet calculation program supplied with some computers (notably the Osborne portable computer) and available for any computer that runs CP/M.

SuperCalc is similar to VisiCalc®, which is the most well-known program on the market. VisiCalc was responsible for increasing microcomputer sales dramatically. The SuperCalc and VisiCalc worksheets and commands are so similar that a user of one can easily learn the other. However, a worksheet created with one cannot be used with the other, *not yet*.

This is not a problem for most users, who pick the "calc" program most suited for their needs. Sometimes, users have no choice, and must use a "calc" program that is available for their brands of computers.

CP/M users have many choices. SuperCalc is perhaps the most widely used "calc" program on CP/M systems, but there are at least ten different "calc" programs on the market for CP/M systems.

Starting SuperCalc

For most CP/M systems, SuperCalc is supplied as SC.COM, with an installation program SCSTALL.COM to use to customize your version of SuperCalc.

To run SuperCalc, type the command ***SC*** followed by RETURN. To run SuperCalc on the Osborne computer, press the Osborne's RESET button, slip the SuperCalc disk into drive A, and press your RETURN key. SuperCalc starts automatically and displays its version number and copyright notice.

SuperCalc has an excellent "help message" facility. If you type a question mark now, or at any time while using SuperCalc, you get a help message that tells you what you can do at that moment. To leave a help message, press any key.

To see the help message, type a question mark. To skip the help message and get right into SuperCalc, press RETURN. SuperCalc presents a blank worksheet ready for use. This worksheet only shows column letters (**A**, **B**, etc.) and row numbers (**1**, **2**, etc.). You have to write your own row labels and column figures, as well as your own formulas.

LESSON ONE: A Sample Worksheet

To start using SuperCalc right away, you can load a sample worksheet supplied with the program. One worksheet on the SuperCalc program disk is called BALANCE.CAL or BAL.CAL (all worksheets have ".CAL" as the filename extension).

Load a Worksheet

Load the sample worksheet by typing a slash (/) followed by an ***L***. SuperCalc automatically displays the rest of the command word (**Load**), followed by a comma, on the SuperCalc *entry line* at the bottom of the screen:

```
Enter File Name (or RETURN for directory)
7⟩/Load,
```

Next, you type the filename of the worksheet. The name of the sample worksheet supplied with SuperCalc is BALANCE.CAL. You need only type the primary name ***BALANCE*** (all worksheets must have the ".CAL" file type, and the Load command expects it):

```
14⟩/Load,BALANCE↵
```

As you type, the number to the left of the ⟩ symbol changes to reflect the number of characters on the entry line.

If you make a mistake typing ***BALANCE***, hold down your Control key (CTRL, CNTL or ALT on some keyboards) and type an ***S*** to move backwards one character. On the Osborne computer and some other keyboards, you can use the left arrow key. Move the cursor to the left, and type over the mistake. Be sure to type over extraneous letters with spaces.

After typing ***BALANCE***, press RETURN. If SuperCalc displays the message **File NOT on Disk** in the lower right corner of the screen (above the entry line), move the cursor back to retype the name (use Control-***S*** or your left arrow key). Try ***BAL*** as the filename rather than ***BALANCE*** (your version of the sample worksheet may be called BAL.CAL rather than BALANCE.CAL).

If SuperCalc still cannot find the file, it may be because your BALANCE.CAL file is not on the SuperCalc program disk in drive A. If it is not, try typing ***B:BALANCE*** to have SuperCalc search drive B.

If SuperCalc finds the file, it displays the message:

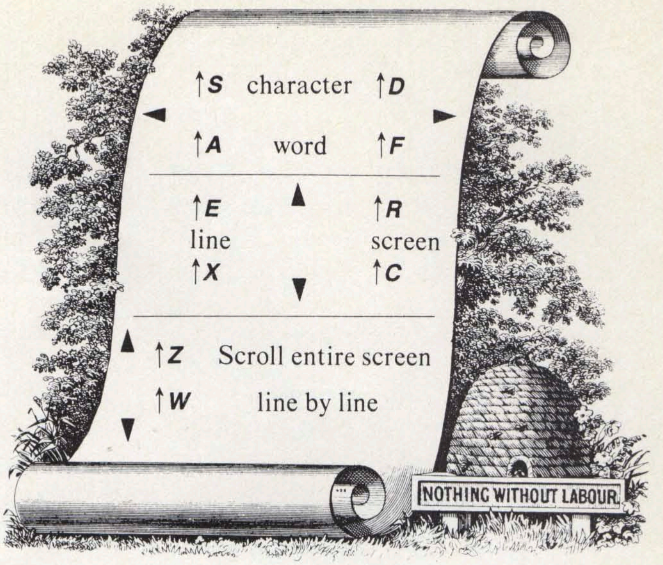
```
(A)ll or (P)art?
```

To load the entire worksheet, type ***A*** for "all." The ***P*** option is for merging two or more worksheets (it loads only part of a worksheet).

SuperCalc will take a few seconds to load the worksheet from the disk into the computer's memory. When the worksheet appears, the cursor will be in the top left corner of the screen. Figure 1 shows the BALANCE sample worksheet supplied with SuperCalc.

Moving Around the Worksheet

Owners of Osbornes and other computers can use their cursor control keys (keys with directional arrows) to move the cursor around the worksheet. Owners of other computers can use cursor movement commands, which are the same as the WordStar cursor movement commands. As in WordStar, you hold down the Control key (CTRL, CNTL or ALT on some keyboards), and type the command. The ↑ symbol stands for the Control key:



↑***X***	Move down one row (line).
↑***E***	Move up one row (line).
↑***D***	Move to the right one column position.
↑***S***	Move to the left one column position.

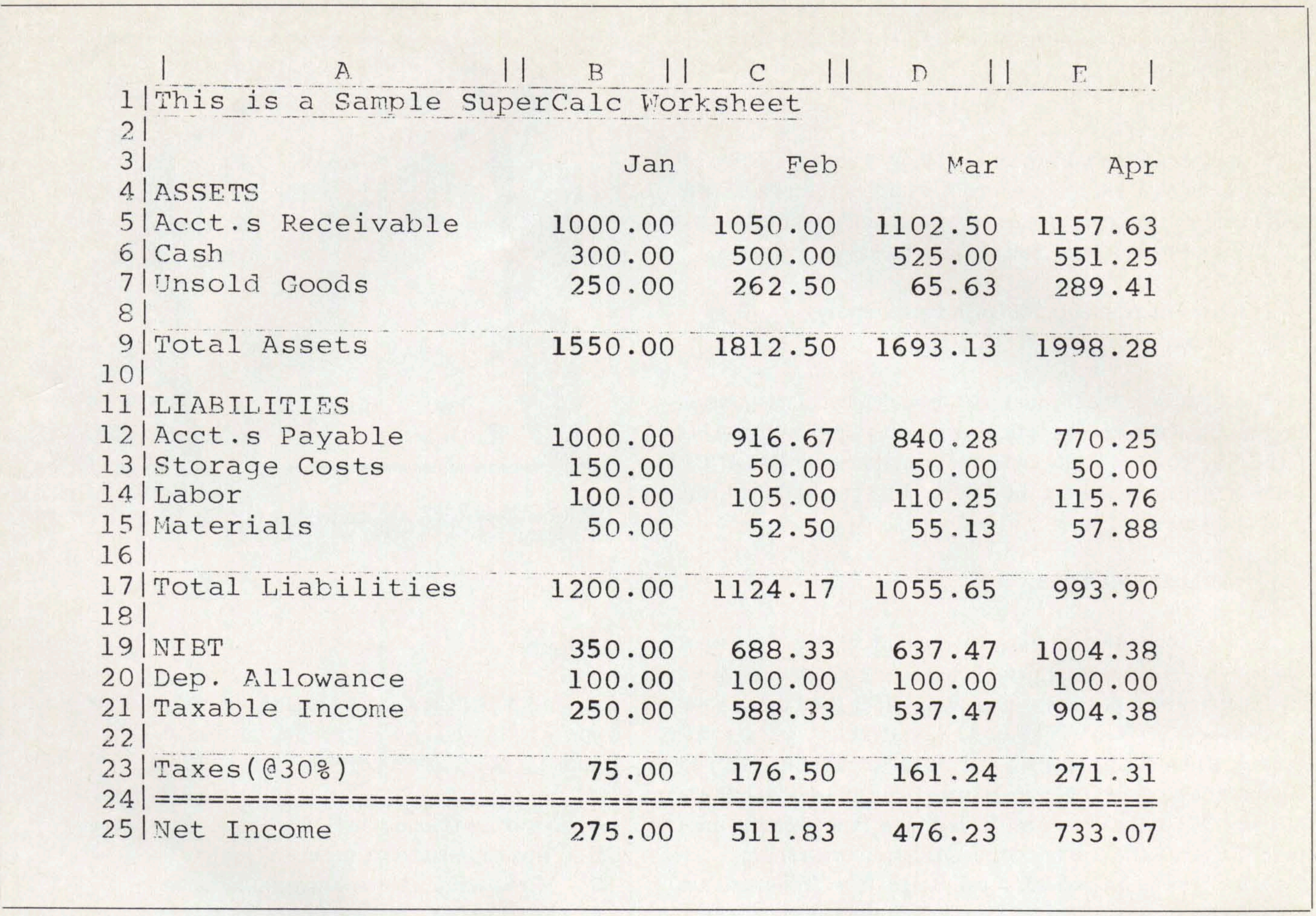
Use these commands (or your arrow keys, if they work) to move around the worksheet. Your display is like a "window" on the entire worksheet, and the cursor is on row 1, column A. As you move the cursor around the worksheet, the *prompt line* (lower left, two lines above the entry line) changes to show the current row and column position, or *cell*.

If the cursor is in the A1 cell, you cannot move it to the left or up because the cursor is at the upper left corner of the worksheet. Move the cursor to the right (right-arrow key, or ↑***D***), and the **A1** displayed on the prompt line should change to **B1**, **C1**, etc. If you go far enough, you should come to column/row **AA1**, and then **AB1**, **AC1**, etc.

SuperCalc on the Osborne computer can manage worksheets that are 64 columns by 254 rows. Since you can have up to 64 columns, SuperCalc uses the entire alphabet, and then AB, AC, AD, etc. as labels for columns. The top left corner is **A1**, and the bottom right corner is **BK254**.

Other versions of SuperCalc (notably G & G Engineering's version of SuperCalc modified to run on CompuPro systems) can manage far larger worksheets. The limitation is essentially the amount of read-write memory (RAM) in your computer.

Move down, to the right, up again, etc., until you've seen most of the worksheet and understand its contents. BALANCE is an income statement that appears to be useful for certain applications (all you need to do is add a few rows or columns, change a few labels, and change the numbers).



```
  |          A          ||    B    ||    C    ||    D    ||    E    |
 1|This is a Sample SuperCalc Worksheet
 2|
 3|                          Jan       Feb       Mar       Apr
 4|ASSETS
 5|Acct.s Receivable     1000.00   1050.00   1102.50   1157.63
 6|Cash                   300.00    500.00    525.00    551.25
 7|Unsold Goods           250.00    262.50     65.63    289.41
 8|
 9|Total Assets          1550.00   1812.50   1693.13   1998.28
10|
11|LIABILITIES
12|Acct.s Payable        1000.00    916.67    840.28    770.25
13|Storage Costs          150.00     50.00     50.00     50.00
14|Labor                  100.00    105.00    110.25    115.76
15|Materials               50.00     52.50     55.13     57.88
16|
17|Total Liabilities     1200.00   1124.17   1055.65    993.90
18|
19|NIBT                   350.00    688.33    637.47   1004.38
20|Dep. Allowance         100.00    100.00    100.00    100.00
21|Taxable Income         250.00    588.33    537.47    904.38
22|
23|Taxes(@30%)             75.00    176.50    161.24    271.31
24|============================================================
25|Net Income             275.00    511.83    476.23    733.07
```

Figure 1. *A sample SuperCalc worksheet.*

To move back to cell A1, type an equal sign (=), then type ***A1*** followed by RETURN. When you typed the equal sign, the entry line looked like this:

Enter cell to jump to.
1⟩=⟩

You type the coordinate A1 as shown:

1⟩=⟩*A1*↩

From position A1, move down four rows (four ↑***X*** or down-arrow keystrokes), and to the right one row (one ↑***D*** or right-arrow keystroke), to the first numeric value for "Accnts. Receivable."

Changing Values

With the cursor in cell B5 (the first value for "Accnts. Receivable"), type the number ***2000*** and press RETURN:

1⟩*2000*↩

Immediately after pressing RETURN, SuperCalc places the number 2000 in that cell and recalculates every other cell. The worksheet is completely updated in an instant.

Also, you'll notice that the cursor moved right horizontally to the next cell. Every time you type a value for a cell and press RETURN, SuperCalc guesses (from the last cursor move you made) which way to move the cursor for the next entry. You can, of course, move in any direction at any time, except when you are in the middle of typing a SuperCalc command.

Type another number with the cursor in the adjacent cell, and watch the worksheet recalculate immediately. How does it do that?

Viewing Formulas

SuperCalc stores more than numbers on this worksheet. SuperCalc also stores *formulas* that can perform any arithmetic function. With formulas you can sum the values in a column or across a row. You can calculate the average of a set of values in a row or column, or compute the net present value (NPV) of a group of cash returns at a given rate of discount.

The formula for a cell is displayed in the lower part of your screen just above the entry line. The formula for cell B5 is shown to be just a number (**2000**, as we typed in the previous example):

Form = 2000

To see the arithmetic formulas that recalculate values on your worksheet, type the command */G* as shown:

```
1⟩/G
```

As you type this command, SuperCalc spells it out for you, and presents the options for the Global command:

```
F(orm.),N(ext),B(order),T(ab),R(ow),C(ol),M(an.),
A(uto)?
9⟩/Global,
```

Select the ***F*** option (**F(orm.)**) to show the formulas on your worksheet. Four cells below the cursor (which should still be on the row for "Accnts. Receivable"), you'll find a simple formula. Move the cursor down to this cell, and the entire formula should be spelled out in the lower portion of your screen, in the center, above the entry line:

```
Form = SUM(B5:B7)
```

This formula is the sum of the cells B5 through B7. If you move the cursor right horizontally to the next cell, the formula should read:

```
Form = SUM(C5:C7)
```

Although the formula changes for each column, it is basically the same formula across the row, with different column coordinates. This is a typical application of SuperCalc worksheets.

To show values again, type the ***/GF*** command again. Typing ***/GF*** shows the formulas, and typing it again shows the values again.

At any time you can type a question mark to get help. For example, type ***/G*** for the Global command, and type a question mark (***?***). SuperCalc answers with a help message that explains each option of the Global command. Press any key, and the help message disappears. Your cursor remains on the entry line in the middle of the Global command, awaiting an option.

"/" Commands

Move the cursor back to the beginning of the entry line, and type only a slash. The following message should appear:

```
Enter B,C,D,E,F,G,I,L,M,O,P,Q,R,S,T,U,W,Z or ?
2⟩/
```

Type a question mark (***?***), and SuperCalc displays a complete summary of all commands that can be typed at that moment.

Split Screen Into Two Windows

To leave the command summary help message, type any key. SuperCalc puts you back on the entry line, with the / already typed. Move the entry line cursor back to the beginning of the line, and move the worksheet cursor to the row between "Total Assets" and "LIABILITIES" (row 10, any column).

SuperCalc is currently displaying one window on your screen. If you move the cursor far enough, information disappears from this window. To keep information from disappearing, you can separate your screen into *two windows*: one that remains stationary, and one that will move as you move the cursor. The Window command lets you draw a window line as a row (horizontally) or as a column (vertically).

Type the ***/W*** command. SuperCalc displays the following:

```
H(oriz.), V(ert.), C(lear Split), S(ynch.) or U(nsynch.)
9⟩/Window,
```

Type a question mark (***?***) for the help message to explain these options:

```
H(orizontal)      Split into two windows at current row.
V(ertical)        Split at current column.
C(lear)           Erase split (return to single window).
S(ynchronize)     Cause    both    windows    to    scroll
                  simultaneously
                  when moving parallel to split.
U(nsynch.)        Cause only current window to scroll,
                  regardless of direction.
```

With the worksheet cursor on row 10, a logical choice would be a horizontal window line. Type any key to return to the entry line, and type the ***H*** option to divide the screen horizontally. Your display should look like figure 2, with the cursor and row 10 in the bottom window, separated from rows one to nine in the top window.

Move the cursor to the right, and the bottom window moves with it. However, the top window does not move. Move the cursor down, and the bottom window continues to scroll, while the top window remains stationary. A typical reason for doing this is to change values on a worksheet and keep a summary area displayed as a non-moving window.

Type a semicolon (***;***) and your cursor jumps into the top window. Now the top window moves and the bottom remains stationary. You can jump back to the bottom window by typing a semicolon (***;***) again. You move your cursor from one window to the other by typing a semicolon.

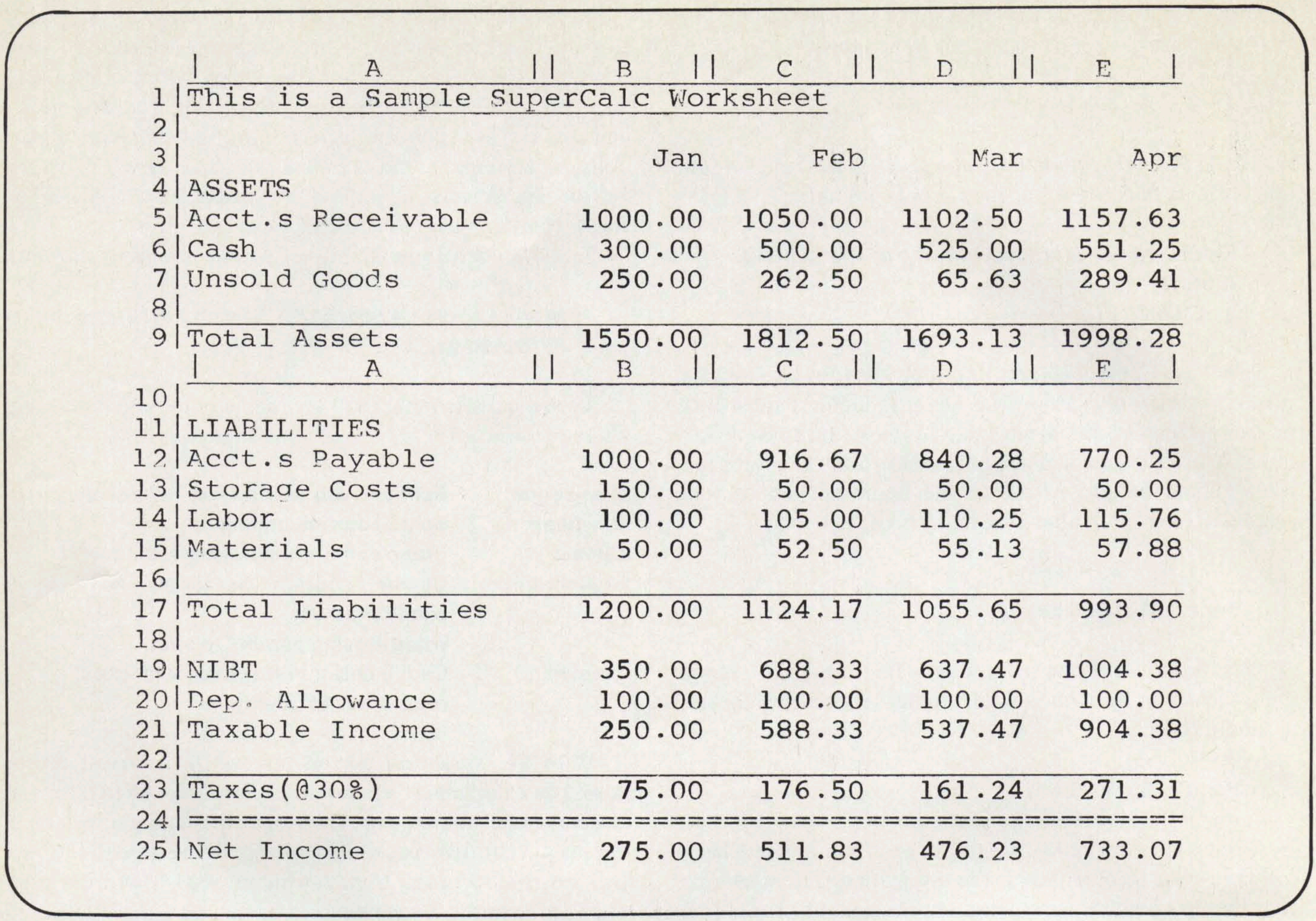
How can you make both windows move? Type the ***/W*** command again, and this time type the ***S*** option to "synchronize" both windows. After typing the ***S*** option, both windows scroll when you move either window horizontally. The window without the cursor remains stationary when the window is moved vertically.

To "un-synchronize" the windows, type ***/WU***. Leave your worksheet with windows for now (change to one window later by typing ***/WC***).

Display Formats

Both windows have row numbers and column letters. Since these borders clutter the screen somewhat (especially the small Osborne computer screen), SuperCalc provides a way to make them disappear (although they are always used to refer to a cell).

Type the ***/G*** command, and type ***B*** for the **B(order)** option



```
  |        A          ||    B    ||    C    ||    D    ||    E    |
 1|This is a Sample SuperCalc Worksheet
 2|
 3|                         Jan       Feb       Mar       Apr
 4|ASSETS
 5|Acct.s Receivable     1000.00   1050.00   1102.50   1157.63
 6|Cash                   300.00    500.00    525.00    551.25
 7|Unsold Goods           250.00    262.50     65.63    289.41
 8|
 9|Total Assets          1550.00   1812.50   1693.13   1998.28
  |        A          ||    B    ||    C    ||    D    ||    E    |
10|
11|LIABILITIES
12|Acct.s Payable        1000.00    916.67    840.28    770.25
13|Storage Costs          150.00     50.00     50.00     50.00
14|Labor                  100.00    105.00    110.25    115.76
15|Materials               50.00     52.50     55.13     57.88
16|
17|Total Liabilities     1200.00   1124.17   1055.65    993.90
18|
19|NIBT                   350.00    688.33    637.47   1004.38
20|Dep. Allowance         100.00    100.00    100.00    100.00
21|Taxable Income         250.00    588.33    537.47    904.38
22|
23|Taxes(@30%)             75.00    176.50    161.24    271.31
24|===========================================================
25|Net Income             275.00    511.83    476.23    733.07
```

Figure 2. *Worksheet with a horizontal window line splitting the screen into two separately-movable windows.*

(before typing ***B*** you can type a ***?*** to list all the options with descriptions). The row-number and column-letter border should disappear from the window holding your worksheet cursor.

Move the cursor to the other window by typing a semicolon (***;***). Type the ***/GB*** command again to make this border also disappear. Some users prefer to make the border disappear for a window that does not move (e.g., a summary area), and keep the border on in the window that moves with the cursor (e.g., a data entry area).

Display Formats

To change display formats, you should first clear the window-split to make one window appear. Type the command ***/WC*** to clear the window-split.

SuperCalc can display the contents of cells as dollars and cents, as integers, as numbers that are right or left justified within the cell, as text that is right or left justified, etc. To see all the options, first type ***/F***:

```
Enter Level: G(lobal), C(olumn), R(ow), or E(ntry)
9>/Format,
```

Type a question mark (***?***) to see the help message for these options. You can select a format for an entry or group of entries, known as a *local* format, or you can select a format for an entire row, an entire column, or "globally" (the entire worksheet).

The options for row, column and global formatting will not override a local format already in use.

Type ***G*** (for **G(lobal)**) to format all entries on the worksheet. SuperCalc displays the formats you can use globally:

```
Define Formats: (I,G,E,$,R,L,TR,TL,*,D,column width)
16>/Format,Global,
```

Type a question mark (***?***) to see the list of formats. The sample BALANCE worksheet is currently using the **$** format, which displays numbers with two decimal digits to the right of the decimal point (used for dollars and cents).

You can change the way numbers are displayed on this worksheet, and the way the text labels are displayed. You also have the option to change the column width for every column of the worksheet.

Type any key to return to the entry line. For now, type ***I*** for the **I(nteger)** option. SuperCalc displays this option on the entry line, and lets you type more options if you wish. You can select several formats at once. For now, press RETURN.

The numbers on your worksheet are now displayed as integers. You can leave them as integers, or change them back to decimal numbers by typing ***/F*** for the Format command, then ***G*** to change the format "globally," and finally ***$*** to change the format to dollars and cents (two decimal places). You can type the command quickly by typing ***/FG$***.

Inserting a Row

Move the worksheet cursor to row 6 ("Cash"), any column. To use the insert command, type ***/I***, which displays the following:

```
R(ow) or C(olumn)?
9⟩/Insert,
```

You can insert a row or a column. Type ***R*** to insert a row. SuperCalc asks you to enter a row number:

```
Enter Row Number
13⟩/Insert,Row,
```

Press your RETURN key, and SuperCalc assumes you want to use the row with the cursor as the row number. Since the cursor is on row 6, SuperCalc uses 6 as the row number, and inserts a blank row between the existing row 5 and 6, turning the old row 6 into row 7. The blank row becomes row 6.

With your cursor on the blank row, type a value such as 500. The worksheet does not immediately change, but if you type an exclamation point (***!***), SuperCalc instantly recalculates the worksheet and includes your newly-typed 500!

Move your cursor down to the new row 10 ("Total Assets" is now row 10), and observe that the formula has changed. The formula is now:

```
Form = SUM(C5:C8)
```

SuperCalc automatically changes the formulas on row 10 to include the newly-inserted row. This occured because you inserted a row between rows that were included in a *range* in a formula. In this case, the range was **C5:C7** (cell C5 through C7), and is now **C5:C8**.

(Our cursor is in column C; therefore, our display shows the formula for cell C10. Your display shows the formula for the cell on row 10 corresponding to the column of your cursor.)

Move the worksheet cursor to row 4, and insert another blank row by typing ***/IR*** followed by RETURN. Move the cursor back to the "Total Assets" row (now row 11), and observe that the formula has changed once again:

```
Form = SUM(C6:C9)
```

The formula changed because the row numbers changed; however, the formula *did not* add your newly-inserted row 4 to the formula. Formulas will include newly-inserted rows only if the row falls *within the range* of the formula. Row 4 did not fall within the range C6:C9.

Entering a Label

Move your cursor to row 6, your un-labeled row, and move it to the left until you reach the column of labels (column A). Your cursor should be sitting in cell A6.

Notice how the cursor suddenly widened? Column A has been previously modified to have a larger column width. You will learn to do this in the next lesson.

To label your newly-inserted row, first type a quotation mark (***"***), which will appear on your entry line. Then type the characters of the label. You can use any letters, digits and symbols in a label, as long as the entry line starts with a quotation mark. Press RETURN to store the label in the cell.

The other labels may be displayed in less intense video. To make your label display as the other labels, type ***/P***, followed by RETURN. This command "protects" the label so that you cannot change it. You can always "unprotect" a label to change it by typing ***/U*** followed by RETURN.

In both cases, you are typing a RETURN to use the current cursor location as the cell coordinate. In any command that asks for a cell number, coordinate, or range, you can use RETURN to select the current cursor location.

Deleting a Row

Now that you've added rows 4 and 6, we'll show you how to delete them. Move the cursor to row 4. Type ***/D*** for delete, and SuperCalc displays the following:

```
R(ow), C(olumn) or F(ile)?
9⟩/Delete,
```

Type ***R*** for **R(ow)**, and press RETURN to supply the current cursor location for the row number (row 4). Row 4 disappears, and all rows are renumbered (SuperCalc automatically renumbers the ranges in all formulas).

Move the cursor to row 6. Try the ***/DR*** command followed by RETURN. This time, SuperCalc displays a message in the lower right corner of the screen above the entry line:

```
Protected Entry
```

SuperCalc cannot delete the row if you protected an entry in the row. You must move the cursor back to the beginning of the entry line to type a new command.

First, move the cursor to cell A6, and then type the command ***/U*** followed by RETURN. This command "unprotects" the entry so that you can type a new entry in the cell, or delete the cell.

Type the ***/DR*** command again, followed by RETURN, to delete row 6. Move the worksheet cursor down to row 9 ("Total Assets"), column C, to see how the formula has changed:

```
Form = SUM(C5:C7)
```

SuperCalc automatically removes row 6, renumbers all rows, and resets the ranges in the formulas to reflect the change.

SuperCalc will not always handle deleted rows so gracefully. Move your worksheet cursor to cell A7 ("Unsold Goods") and "un-protect" the entry by typing ***/U*** followed by RETURN.

Now delete row 7 by typing ***/DR*** followed by RETURN. The word **ERROR** should appear all along row 8 ("Total Assets") and along other rows as well. Row 7 was used in the formulas on the "Total Assets" row to define the ranges B5:B7, C5:C7, D5:D7, etc. You have deleted a row that was used as a range limiter.

Other rows are also affected. The formulas for "NIBT" and "Taxable Income" were based on the row "Total Assets," which is now in error.

Move to cell B8 which contains an **ERROR**. The formula line above the entry line shows where the error occured:

```
Form = SUM(B5:ERROR)
```

In the next lesson you will learn how to edit an entry and change formulas. However, if you want to experiment, go ahead and type a new formula on the entry line. Try typing ***SUM(B5:B6)*** followed by RETURN (you can type formulas and ranges in lower case letters). This should replace the error in cell B8 with a new formula.

Zap and Re-load the WorkSheet

Since the worksheet is now loaded with errors, type ***/Z*** to clear the worksheet. SuperCalc asks if you want to clear everything, to make sure you meant to use this command (this is a safety feature to prevent you from accidently wiping out a worksheet before saving it):

```
Y(es) to clear everything, else N(o)
24>/Zap-ENTIRE-Worksheet?
```

Answer yes by typing ***Y***, and SuperCalc instantly clears your worksheet. To re-load the BALANCE worksheet, type the ***/L*** command, which displays the following:

```
Enter File Name (or RETURN for directory)
7>/Load,
```

For a directory display of filenames, press RETURN, and SuperCalc displays several options:

```
C(hoose) alternate disk drive
D(isk) directory, All files
S(uperCalc) format files only
CTRL-Z to return to worksheet.
```

To see a directory of the files on the currently logged drive (usually drive A), type ***D*** or ***S***. ***D*** displays all filenames in the directory, and ***S*** displays only filenames that have the ".CAL" extension (required for worksheet files).

To see a directory of the files on another disk, press ***C*** first, then type the drive letter (e.g.,***A***, ***B***, etc.). SuperCalc displays the drive letter at the top right corner of your screen, after the message **Work disk is ....**

If you use the ***S*** option, SuperCalc displays the names of SuperCalc worksheets in the current work drive (files with the ".CAL" extension), and a "Creation Comment" derived from the first cell (A1) of the worksheet. When you create your own worksheets, you should put a label in cell A1 that describes the worksheet, so that you can display a "Creation Comment" in the SuperCalc directory display.

After viewing the directory display, hold down your Control key (CTRL, CNTL or ALT on some keyboards) and type ***Z***. You return to the entry line, where you can type the name of the worksheet to be loaded:

```
14>/Load,BALANCE↵
```

After pressing RETURN, SuperCalc asks if you want to load all of the worksheet, or only part of it:

```
A(ll) or P(art)?
15>/Load,BALANCE,
```

Type ***A*** (for the **A(ll)** option) to load the entire worksheet into memory. The **P(art)** option is for merging two or more worksheets, or for loading a portion of a large worksheet that will not entirely fit in memory. In another lesson you will learn how to merge worksheets.

Printing a WorkSheet

If you have a printer connected to your computer that works from CP/M, you can use SuperCalc to print the worksheet in memory. To test to see if your printer works from CP/M, type a Control-P from a CP/M command line, and type a few characters. These characters should be repeated on your printer. Type another Control-P to stop this printer "echoing" of your typed characters.

To start a print operation, load a worksheet into memory, and prepare it for printing by typing ***/O*** (for **O(utput)**). SuperCalc displays the first options:

```
D(isplay) or C(ontents) report?
9>/Output,
```

Type ***D*** for a **D(isplay) report**. A **C(ontents)** report lists each entry's contents line by line, whereas a **D(isplay)** report prints the worksheet as it appears on your screen.

SuperCalc asks for a range. Type a question mark (***?***) to see a help message that describes appropriate responses. You can supply any of the following as a range:

Example	Description
B3	A cell coordinate to print one entry.
2	A row number (from 1 through 253) to print a single row.
C	A column letter (A through BK) to print a single column.
A1:D15	A block specified by a start (A1) and an end (D15) defining an area of rows and columns.
ALL	The entire worksheet.

To print the entire worksheet, type ***ALL*** as your range, and press RETURN:

```
Enter Range
17>/Output,Display,ALL↵
```

SuperCalc displays several more options:

```
Enter Device: P(rinter), S(etup), C(onsole), or D(isk)
21⟩/Output,Display,ALL,
```

The **C(onsole)** option (type ***C***) lets you "print" the report on your console instead of the printer. The **D(isk)** option lets you send the output to a disk file instead of the printer.

The **P(rinter)** option sends the worksheet immediately to the printer. However, you may want to check the SuperCalc printer settings (set when SuperCalc was installed) before printing. Type ***S*** to select the **S(etup)** option, and SuperCalc displays the printer control menu:

```
L        = Change page length      (now 66 lines)
             (Length = 0 for continuous form.)
W        = Change page width       (now 132 chars)
S        = Manual setup codes
P        = Print report
    CTRL-Z to cancel /O command

    L(ength), W(idth), S(etup codes) or P(rint)?
    26⟩/Output,Display,ALL,Setup
```

Change the page length to match your paper by typing ***L*** and a number between zero and 255 (55 lines is appropriate for 11-inch paper length). Use zero for continuous forms paper.

Change the page width by typing ***W*** and a number between zero and 255 (65 or 70 is appropriate for an 8.5-inch paper width).

With the page width and length set to appropriate values, type ***P*** to print the report. If you need to stop the printer, type Control-***Z*** (hold down your Control key and type ***Z***).

Save the Worksheet

Whenever you create or make changes to a worksheet, you must explicitly *save* the worksheet in a file by typing the ***/S*** command:

```
Enter File Name (or RETURN for directory)
7⟩/Save,
```

Type the name of the file for saving the worksheet. Include a drive prefix if you intend to store the file on a disk other than the current work disk.

Do not supply a filename extension, since SuperCalc will automatically attach the ".CAL" extension to your name. For example, to call the edited version of the BALANCE worksheet by the new name BAL1, you would type the new name followed by RETURN:

```
Enter File Name (or RETURN for directory)
11⟩/Save,BAL1↵
```

SuperCalc then displays the message:

```
A(ll) or V(alues)?
12⟩/Save,BAL1,
```

If you type ***A***, SuperCalc saves the entire worksheet, including format settings, global settings and window split (if a split is active), in the file BAL1.CAL on the current work drive.

If you type ***V***, SuperCalc saves everything except the formulas. (Use this option to create a worksheet whose values will be merged with another worksheet, but whose formulas will not be merged. We explain merging in the next lesson.)

NOTE

If you use the same filename (BALANCE) for the edited worksheet, SuperCalc displays the following message:

```
File already exists: C(hange name), B(ackup) or
O(verwrite)?
```

You can update the old file by *overwriting* it. Type the ***O*** option to save the worksheet on your screen in the existing file, replacing the old contents of the file.

You can save the old contents by typing the ***B*** for **B(ackup)**. This option saves the old version of the file in BALANCE.BAK, and the new version in BALANCE.CAL.

You can leave the old file alone and change the name of your new file by typing ***C***. After typing this option you return to the entry line to retype your filename.

Zap and Quit SuperCalc

To clear your worksheet, type the ***/Z*** command:

```
Y(es) to clear everything, else N(o)
24⟩/Zap-ENTIRE-Worksheet?
```

Answer yes by typing ***Y***, and SuperCalc instantly clears your worksheet.

To leave SuperCalc, type ***/Q*** for the Quit command:

```
EXIT SuperCalc? Y(es) or N(o)
7⟩/Quit,
```

If you type ***N*** you will stay in SuperCalc. Type ***Y*** to leave SuperCalc and return to CP/M.

End of Lesson

Lesson one shows how to edit an existing worksheet. Lesson two (in the next issue of *User's Guide*) shows how to create typical worksheets: a budget, an income tax worksheet, and a cash flow statement.

An alternative to writing your own worksheet is to use the SuperCalc "calc aids" offered by various dealers. These aids are files containing SuperCalc worksheets for typical applications — budgeting, income forecasting, break-even analysis, cash flow, etc. — without the actual numbers, but *with* the formulas. You can use these aids (sometimes called *templates* or *blanks*) by loading them as if they were completed worksheets, and typing your actual numbers into the entries.

Lesson two (next issue) will also show you how to create your own "calc aids" or blank templates for worksheets, and how to use SuperCalc data with WordStar.

Continued from page 5

programs are offered with one or more "modes" of operation. In each mode, each feature is set to a *default setting* that is useful for operating in that mode. You simply select the mode, and your features are pre-set for you.

For example, WordStar's document mode uses the following settings that you do not have to think about unless you want to change them:

- A printed page is defined to be 8.5 x 11 inches. The text is printed within margins that are approximately one inch on either side, one-half an inch from the top, and 1.5 inches from the bottom. This setting prints approximately 65 characters per line, and 55 lines per page.

- Page numbering is automatic, starting from page one, with page numbers centered within the bottom margin space approximately one-half inch from the bottom of the page.

- Tab spaces are exactly five character spaces. Screen margins allow 65 characters per line. Lines are justified to the right margin, but text can be typed ragged-right by turning off this justification feature.

- Line spacing is single-spaced, although you can double-space your lines by turning this feature on (when you type, the lines are automatically double-spaced).

Computers can make a writer far more productive. WordStar reduced our exasperated weeks of writer's block to mere moments of indecision. We can type paragraphs of drivel just to warm up. Somewhere in the cerebral staccato is a paragraph we can use somewhere, in some article or book chapter...

Spreadsheets

After the novelty of the microcomputer wore off, many people felt disenchanted with the machine that promised so much in potential and delivered so little useful software. Apple computers were criticized for this reason until a program appeared that changed everything: VisiCalc.

This program delivered everything it promised. VisiCalc, from Personal Software (now VisiCorp), provided the ability to draw a spreadsheet of calculations on the screen and print it as it appeared on the screen.

VisiCalc, which at that time ran only on the Apple, broke ground for a series of "calc" programs for other computers. The most widely used "calc" programs for the variety of CP/M systems was and still is SuperCalc, from SORCIM Corp.

Look at figure 1 in the "Guide to Using SuperCalc" in this issue. This is a SuperCalc worksheet, also known as a *spreadsheet* or a "calc" sheet. If a financial planner were to do one on paper, using a pencil and calculator, it would probably look just like the worksheet in figure 1, possibly without letter and number labels for the rows and columns.

Why use a computer for such a task? Wouldn't it be harder? To some people, it *would* seem harder at first to use a computer to draw such a worksheet. In fact, typing the names for each row and the figures for each column may take longer than doing it by hand, on paper, with a pencil.

Also, using a calculator to make the initial calculations may seem an easier task than learning a set of SuperCalc commands to use the computer.

OK, but what happens when you've got your worksheet filled with calculations, and you want to change *the first value* you used for your calculations? You have to perform the calculations over again — each and every one. You have to do a lot of erasing... oh, you didn't use a pencil? Too bad. Correction fluid is available at your local stationery store...

The SuperCalc program gives you the power to change the first value of your calculations, or *anything*, including the *formulas* you used in your calculations, with instant results appearing on the screen, in their proper places on the worksheet.

The program is readily useful for producing budgets, sales forecasts, income statements, scientific conversion tables, tax tables, cash flow statements, depreciation schedules, etc.

SuperCalc's abilities are generalized to let you produce any type of numeric labeled report in rows and columns. WordStar's abilities are also generalized — to let you produce documents, reports of any type or size, memos, letters, and even graphics using conventional letters, digits and symbols.

You pay a price for these generalizations. The programs, in order to provide the greatest flexibility, have a lot of commands and options to remember. However, you can safely avoid many commands and options, and still do many useful things, by staying within the default settings.

Corrections to Issue #1

The only "gotcha" in issue #1 is an example on page 18. We claim that you can find SAVE.COM using several "ambiguous filenames." The only problem with this example is that if you have a program called SAVE.COM on disk, you would not be able to execute it! CP/M has a built in command called SAVE; therefore, if you type ***SAVE*** and press RETURN, CP/M will execute the SAVE command, and never search the disk for a SAVE.COM file.

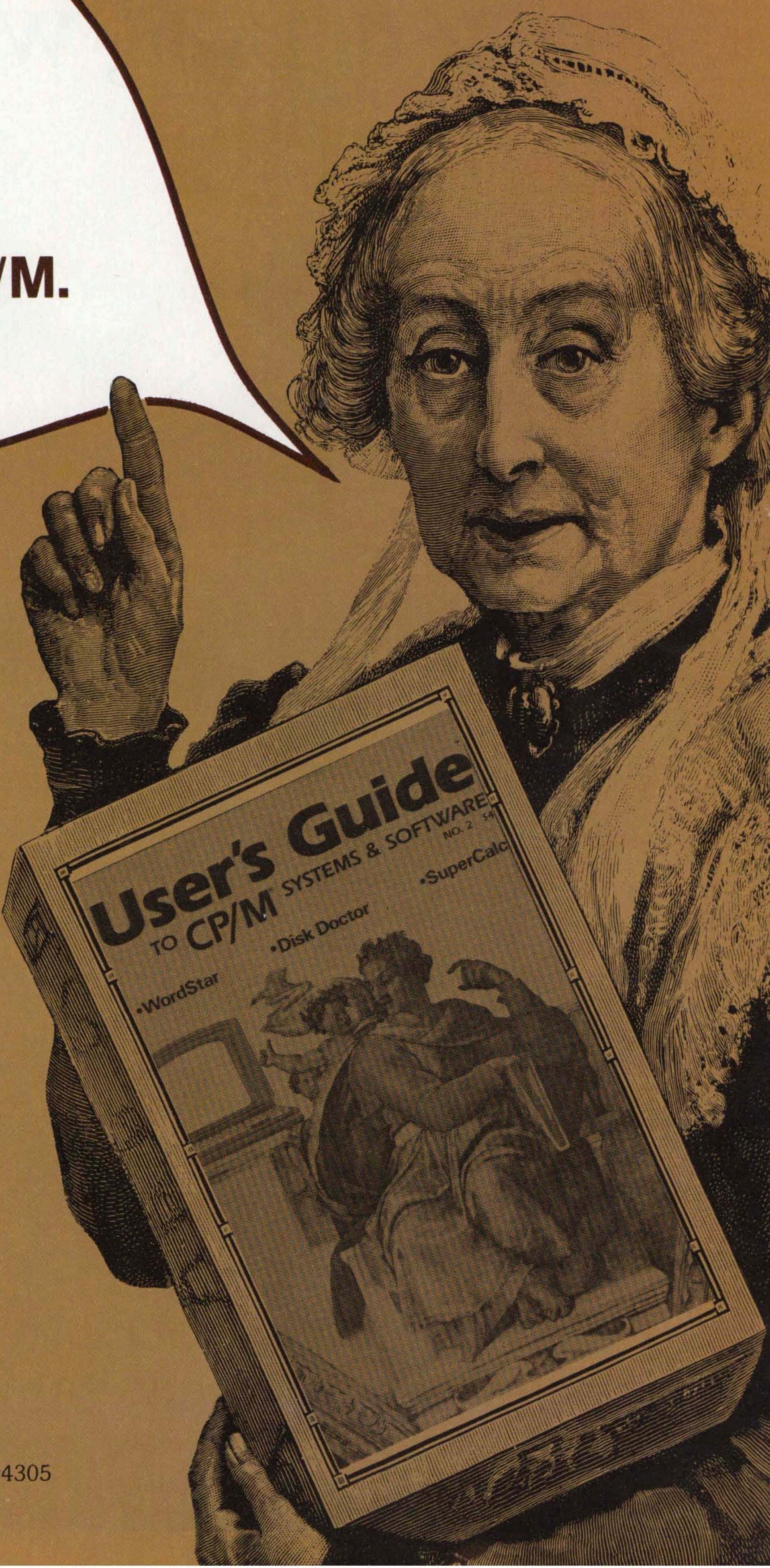
The example was correct. If you did have a file called SAVE.COM, you could find it using those ambiguous filenames. However, *do not* rename any of your programs to SAVE.COM!

A few other corrections: the word "separate" is spelled incorrectly on page 1. The already-proofed version of the article, sent through the SpellGuard spelling checker on our CP/M system, somehow disappeared as we made backup disk copies...

Finally, a paste-up mixed up pages 34 and 35. To read the article in proper order, read in sequence page 33, then 35, *then* 34, and then continue with page 36.

Your Granny Knows Best!

Reach For the *User's Guide* to CP/M.


User's Guide
TO CP/M
SYSTEMS & SOFTWARE
NO. 2
•SuperCalc
•Disk Doctor
•WordStar

User's Guide *is the most readable publication in the computer industry. It is the only periodical that provides tutorials and reference documentation in a magazine format for both newcomers and experienced computer users.*

Each issue provides a tutorial for beginners as well as "impatient user's guides" on using *systems and programs.* **User's Guide** *provides documentation for the CP/M family of systems, including MP/M, CP/Net, other versions of CP/M and CP/M-compatible software.*

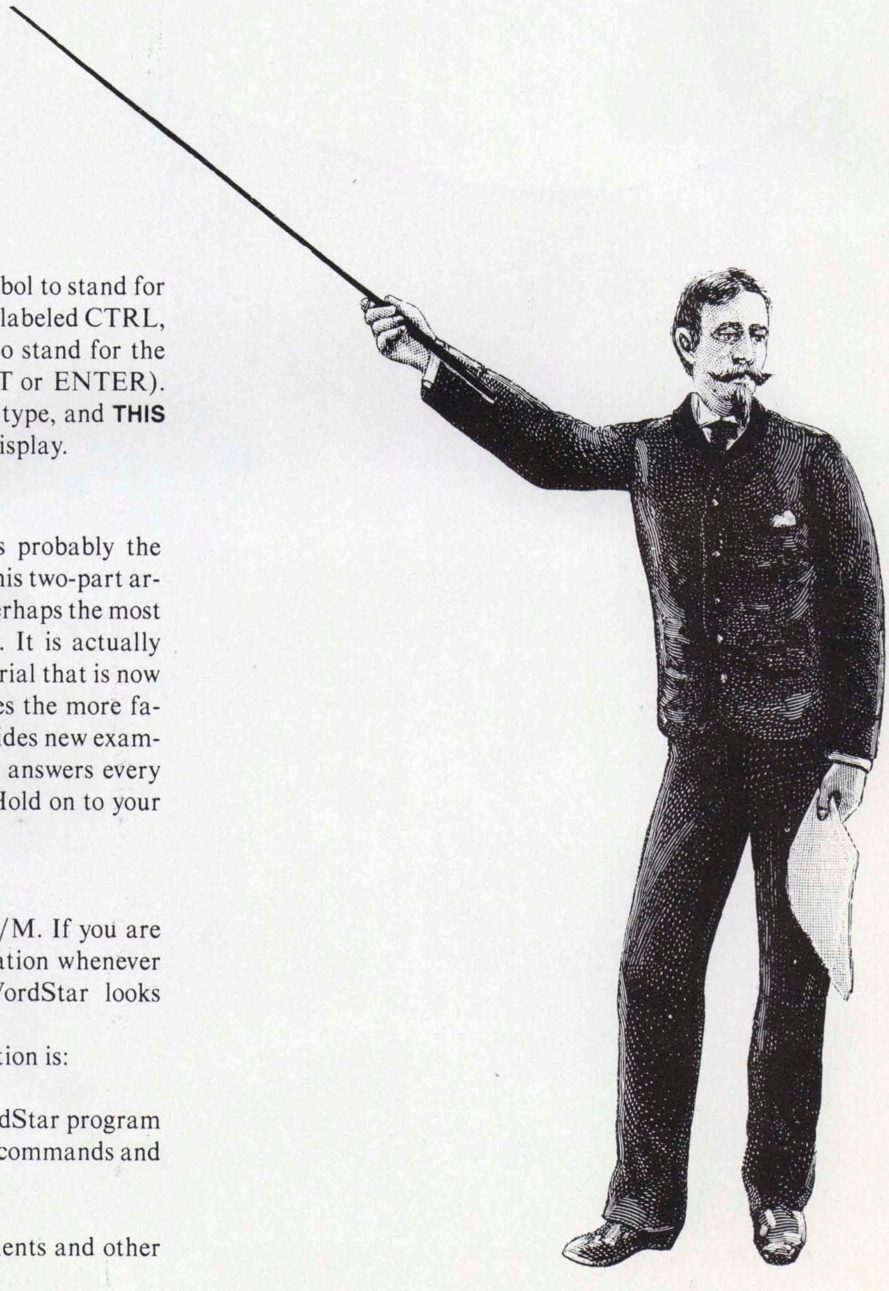
User's Guide, P.O. Box 3050, Stanford, CA 94305

Tutorial...

A Guide to Using WordStar: Part One

The Star of Microcomputer Word Processors

by Tony Bove & Cheryl Rhodes



In this tutorial we use the ↑ (uparrow) symbol to stand for the Control key on your keyboard (sometimes labeled CTRL, CNTL or ALT), and we use the ↵ symbol to stand for the RETURN key (sometimes labeled CR, RET or ENTER). We use ***THIS FACE*** to show what you should type, and **THIS FACE** to show what appears on your system display.

WordStar®, from MicroPro International, is probably the most widely used word processing program. This two-part article (part two to be published in issue #3) is perhaps the most concise tutorial on WordStar ever published. It is actually condensed and rewritten from a lengthier tutorial that is now out-of-print and unavailable. This version uses the more familiar SAMPLE.TXT file for examples, provides new examples of doing useful WordStar functions, and answers every question ever put to us by a WordStar user. Hold on to your keyboards.

Disk Setup

This tutorial assumes you are running CP/M. If you are not, substitute your operating system information whenever we mention CP/M commands directly. WordStar looks pretty much the same on all systems.

The typical disk setup for WordStar operation is:

- *System disk* in drive A: to hold the WordStar program and its "overlay" files, as well as CP/M commands and programs.

- *Text file disk* in drive B: to hold documents and other text files.

Starting WordStar

To start WordStar, type the following CP/M commands:

```
A>B:↵
B>A:WS↵
```

The WordStar program displays a quick start-up message that tells you what version of WordStar you are running, and what keyboard/display terminal and printer your version will work with. This message stays on for only a few seconds, and then WordStar displays a larger message, called a *menu.* This menu is one you'll see every time you use WordStar. It's called the "no-file" menu (*figure 1*).

```
           editing no file
                   < < <  N O - F I L E  M E N U  > > >
     ---Preliminary Commands---    | --File Commands-- | -System Commands-
  L  Change logged disk drive      |                   | R  Run a program
  F  File directory    off (ON)    |  P  Print a file  | X  Exit to system
  H  Set help level                |                   |
     ---Commands to open a file--- |  E  Rename a file | -Wordstar Options-
        D   Open a document file   |  O  Copy   a file | M  Run MailMerge
        N   Open a non-document file| Y  Delete a file | S  Run SpellStar

  DIRECTORY of disk B:
```

Figure 1. *WordStar's no-file menu provides CP/M system functions from within the WordStar program. You can start a WordStar edit session with* ***D*** *or* ***N****, or perform file operations, or change help and directory displays, or select the MailMerge or SpellStar functions, or even execute a CP/M program.*

You can use the *file commands* shown in the no-file menu to rename, copy, print and delete files. Without WordStar you would have to use CP/M commands to perform these activities; with WordStar you can perform system activities while using WordStar.

Under the no-file menu is a directory listing, as if from a CP/M DIR command. This file directory can be *turned off* by typing the ***F*** command, or *turned back on* by typing the ***F*** command again.

```
F = File directory off (ON)
```

The **(ON)** display tells you the "toggle" command is turned on. You can turn it off by typing the command, and turn it back on by typing the command again.

You can also run a CP/M utility program from WordStar by typing the ***R*** command (a *system command* from the no-file menu). For example, you can type ***R***, and the following message appears:

```
COMMAND?
```

Type the name of a CP/M utility program (a ".COM" file), such as ***XDIR***, followed by RETURN:

```
COMMAND? XDIR↵
```

WordStar wakes up CP/M, looks for a ".COM" file by the name XDIR.COM, and if it finds XDIR.COM, WordStar executes the program. After the program stops executing, WordStar displays the message:

```
Hit any key to return to WordStar:
```

Press any key, and WordStar will display the no-file menu again.

The ***X*** command exits from WordStar to CP/M. The ***M*** command activates the MailMerge option ("Merge-Print" in the Osborne version), and the ***S*** command activates the SpellStar option, if you have these options (they may cost extra).

NOTE

If you find yourself in another menu, and it is not obvious which choice you should make, try the ESC (Escape) key on your keyboard to return to the no-file menu. If something is in progress and ESC doesn't help, try this sequence: hold down your Control key (CTRL, CNTL or ALT on some keyboards), and type a ***U***, then press the ESC key. You should end up in the no-file menu. The ESC or Control-***U***-ESC combination in the no-file menu does nothing.

Changing the "Logged" Drive

Before trying any of the WordStar options like MailMerge and SpellStar (which are more complicated and need further explanations), try one of the *preliminary commands*: the ***L*** command to change the "logged" disk.

The "logged disk drive" in WordStar is the drive WordStar uses to find your text files, if their names are not prefixed with a drive letter and colon. The "logged drive" is the drive whose file directory is displayed under the no-file menu.

If your "logged drive" is drive A and your text files are on the disk in drive B, you can use a drive prefix to help WordStar find the file (e.g., ***B:SAMPLE.TXT*** has the drive prefix ***B:***).

WordStar always uses the drive from which it was executed as the "logged disk drive" until you change it. If you executed WordStar from drive A, the "logged disk drive" is drive A. However, it is typical and useful to use a text file disk in drive B, and a system disk with the WordStar program and utility programs in drive A. You should therefore change the "logged drive" to drive B, so that WordStar can find your text files. (You can always prefix your text files' names with ***B:*** to help WordStar find them from drive A.)

To change the "logged drive" to drive B, press ***L***, and the following message should appear on your screen:

```
THE LOGGED DISK DRIVE IS NOW A:

NEW LOGGED DISK DRIVE (letter, colon, RETURN)?
```

Type ***B:*** as shown, and press the RETURN key:

```
NEW LOGGED DISK DRIVE (letter, colon, RETURN)?B:↩
```

The light on drive B should turn on while WordStar is reading the disk. WordStar should then display the file directory for drive B.

When you started running WordStar you "logged into" drive B by typing ***B:***↩, and ran WordStar from drive B (using the ***A:*** prefix with ***WS***):

```
A>B:↩
B>A:WS↩
```

After exiting from WordStar (***X*** from the no-file menu), you return to the "logged" drive, which is now drive B. While in drive B you can select another text file disk and type a ↑***C*** (Control key and ***C***) to orient the system to the new disk. This is an easy way to change disks between WordStar sessions.

NOTE

Never take a disk out of a disk drive during a WordStar session, even if you've run out of space. You will probably destroy the data on a disk if you substitute it for either the current system disk in drive A or the current text file disk in drive B (or C, etc.). You can only replace a disk while in CP/M, and you must type a Control-***C*** (↑***C***) to show CP/M where to write on the new disk.

Copying a File

If you just bought your copy of WordStar, you should have a file called SAMPLE.TXT on the master disk with the WordStar program. Copy it to the disk in drive B by typing the ***O*** command from WordStar's no-file menu. The ***O*** command displays this message:

```
NAME OF FILE TO COPY FROM?
```

Type ***A:SAMPLE.TXT*** and press the RETURN key (remember to include the ***A:*** prefix). If you make a typing mistake, use your backspace key (RUBOUT, DEL, or left-arrow key on some keyboards) to move the cursor backwards and erase the typing mistake.

```
NAME OF FILE TO COPY FROM?A:SAMPLE.TXT↩
NAME OF FILE TO COPY TO?
```

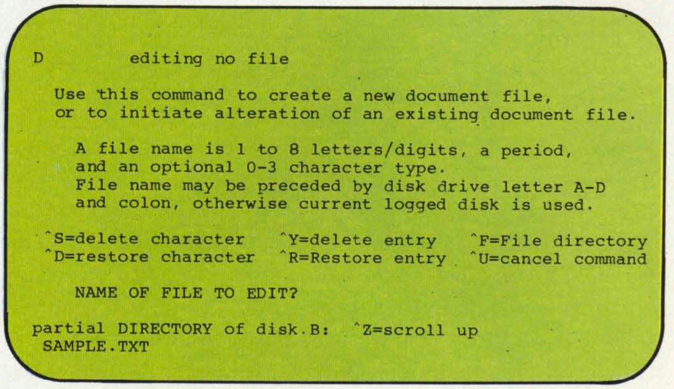
To answer the second question, type ***B:***, then hold down your CTRL key and type an ***R***. The CTRL-***R*** command remembers the filename **SAMPLE.TXT** from the previous question, and retypes it for you.

Now press RETURN, and WordStar copies the file to drive B. When the transfer is done, WordStar displays an updated file directory showing SAMPLE.TXT on the disk in drive B. You are now ready to edit the file.

LESSON ONE:
Creating/Editing a Document File

You should have WordStar's no-file menu on your screen, and a file directory. If the directory shows the name SAMPLE.TXT, then you will be editing that file. If it does not show such a filename, you will be creating a new file called SAMPLE.TXT.

Type the ***D*** command to "open a document file." This command will allow you to type the name of a file, which WordStar will either find (if it already exists), or create (if it doesn't already exist). Type ***D*** and this message should appear:



```
D        editing no file

  Use this command to create a new document file,
  or to initiate alteration of an existing document file.

    A file name is 1 to 8 letters/digits, a period,
    and an optional 0-3 character type.
    File name may be preceded by disk drive letter A-D
    and colon, otherwise current logged disk is used.

 ^S=delete character    ^Y=delete entry    ^F=File directory
 ^D=restore character   ^R=Restore entry   ^U=cancel command

    NAME OF FILE TO EDIT?

partial DIRECTORY of disk.B:  ^Z=scroll up
 SAMPLE.TXT
```

```
NAME OF FILE TO EDIT?
```

Type the name ***SAMPLE.TXT*** to edit the existing sample text file. If you have no existing sample file, or if you want to create a new file and not edit SAMPLE.TXT, pick a name for your new text file, such as MYFILE.TXT. Use the period (.) and a three-character extension such as ***.TXT*** to indicate that the file contains text.

NOTE

We suggest you use the ".TXT" extension for your text files, since it is widely used. The ".TXT" extension is better than no extension, since the name tells you exactly what the file contains — text. DO NOT select extensions like ".COM" or ".BAK" since they are used specifically for other reasons. In fact, *never* select a new or existing file with a ".BAK" extension.

For our examples we use the text in the supplied SAMPLE.TXT file. We start you off by typing your own text at the beginning of the file. Those readers without a supplied SAMPLE.TXT file can follow along and type the new text, and where necessary, type their own text to match the examples.

NAME OF FILE TO EDIT? *SAMPLE.TXT*

WAIT! Don't press your RETURN key yet. First you should practice using the several optional commands that allow you to edit the filename you are typing.

Above the **NAME OF FILE TO EDIT?** message is a display of several editing commands, all of which start with the ↑ symbol. This symbol stands for the Control key (CNTL, CTRL or ALT) on your keyboard. These commands are also known as "control key sequences" because you hold down the Control key while typing the letter of the command.

For example, hold down your Control key and type an ***S*** (the ↑***S*** command), and the cursor will move back one space and erase the last character typed. Repeat this command several times to "rub out" the filename you typed.

Now try another command: hold down your Control key and type an ***R*** (for the ↑***R*** command). The filename you typed and rubbed out should now reappear — this is a "restored entry."

You can use these editing commands whenever they appear as a message above an area where an entry is required. Popular ones are the ↑***U*** command to cancel the entire menu and question and return to the previous no-file menu, the ↑***Y*** command to erase the entire entry, and ↑***R*** to restore the previous entry. The ↑***F*** command will turn on or off the directory display of your current "logged" disk (keep the directory display on for now).

When you've finished experimenting with these commands, type the name of your new text file and press RETURN. If your experiments take you out of this menu and back to the no-file menu, select the ***D*** command to open a document file, and then type the entry, followed by RETURN:

NAME OF FILE TO EDIT? *SAMPLE.TXT*↩

WordStar first looks for the file's name in the directory of the "logged" drive (or other drive if you specify a drive prefix with the name). If the filename you typed is an entry in the directory, WordStar finds the file's text and prepares it for use with WordStar. This is called "opening" the file.

If the name is not in the directory, WordStar creates a new directory entry with the name you typed, and creates a new file.

After typing your filename entry, you should see a flurry of action on your screen and hear something happening with your disk drives. WordStar is preparing both your screen and your disk for your new text file. (WordStar keeps going back to your system disk for instructions from its "overlay" files.) After these preparations, you should have a screen display like the one shown in figure 2.

The screen display shows WordStar's main menu in the upper half of the screen. The text of SAMPLE.TXT appears below this menu. If, however, you are creating a new file, the text area will be empty, and you'll see : symbols outside the right margin marking the empty lines.

Separating the menu and text areas is a ruled line, with **L** and **R** for the left and right margins, and **!** marking each TAB stop (TAB stops are similar to typewriter tabs). Above the main menu is a message telling you the name of your file, the printed page number, and line and column numbers of the cursor position.

What should you do now? Create a blank line by typing a Control-***N*** command. Hold down your Control key (CTRL, CNTL or ALT on some keyboards) and type an ***N*** to create a blank line. Try it again, twice, to create two more blank lines. Now, type one or more lines of text as shown below, to see how WordStar works.

Typing and Erasing

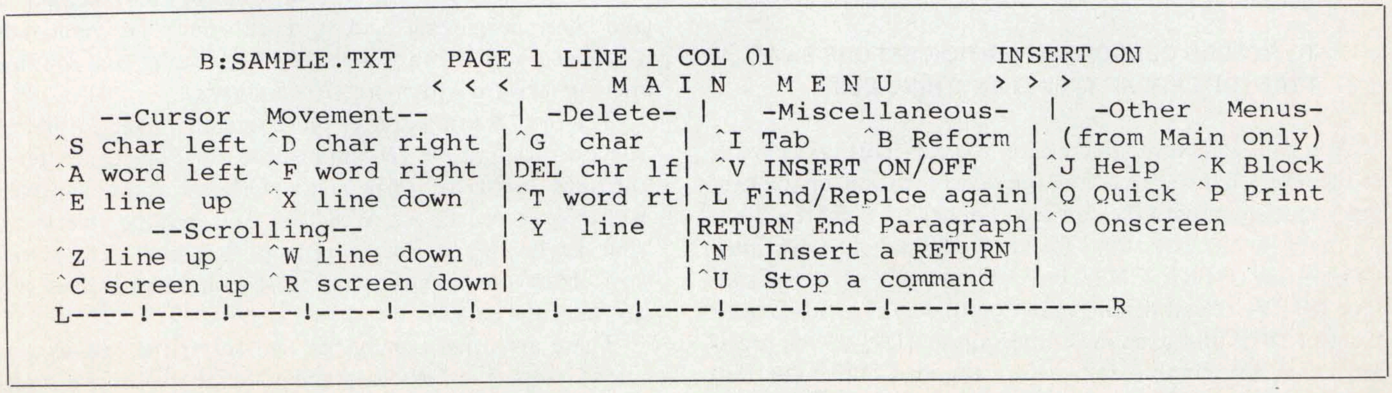
Unlike typewriters, computers let you type and type and type without pressing the RETURN key. In fact, you press the RETURN key only to end paragraphs or to end lines that do not reach the right margin.

Also unlike typewriters, computers let you *erase* letters as easily as you typed them. If you make a typing mistake, use your DEL or RUBOUT key.

NOTE

If you have an Osborne computer, the DEL or RUBOUT key is not provided — instead, hold down your CTRL key and type a dash (-). This combination will only work on Osborne keyboards; other computer keyboards usually provide the DEL or RUBOUT key.

This action moves the cursor to the left one column, erasing whatever character was in the column. You can even erase backwards to the previous line.



```
          B:SAMPLE.TXT    PAGE 1 LINE 1 COL 01              INSERT ON
                        < < <        M A I N    M E N U        > > >
   --Cursor  Movement--      | -Delete- |    -Miscellaneous-   |  -Other  Menus-
^S char left ^D char right |^G  char   | ^I Tab    ^B Reform | (from Main only)
^A word left ^F word right |DEL chr lf| ^V INSERT ON/OFF     |^J Help   ^K Block
^E line  up  ^X line down  |^T word rt|^L Find/Replce again|^Q Quick ^P Print
      --Scrolling--        |^Y  line   |RETURN End Paragraph|^O Onscreen
^Z line up   ^W line down  |           |^N  Insert a RETURN  |
^C screen up ^R screen down|           |^U  Stop a command   |
L----!----!----!----!----!----!----!----!----!----!----!--------R
```

Figure 2. *WordStar's main menu for editing activities.*

As you type (use the SHIFT key for UPPER case letters as you would on a typewriter), you will notice the **COL** number above the menu counting each column, and as you reach the end of a line (DON'T PRESS the RETURN key yet — keep on typing), watch the sentence wrap around to the next line, and the **LINE** number register the new line.

Won't you try just a little bit harder, won't you try just a
little bit more? The paragraph keeps going and you shouldn't
stop now, you can't type ESCAPE and you shouldn't type RETURN,
you can't go back and you can't stand still, if this word doesn't
wrap-around the next word will! ⮐ <

That was easy, wasn't it? As you typed a line, it wrapped itself around to the next line, and also *justified* the line. To justify a line of text, WordStar inserts spaces between words so that the lines end exactly at the right margin.

If you don't like *right-justified* text (text justified to the right margin), you can turn off this feature and have a "ragged right" margin. The text fills out to the right margin, but without extra spaces between words. The *turn off justification* (turn on ragged-right) command is shown in lesson two.

Add a blank line to your text file by pressing RETURN once, then add another paragraph if you wish (several lines, followed by a RETURN to end the paragraph).

With enough text on your screen, you can begin to see WordStar's features. It justifies your text as you type it, keeps accurate margins for you, and keeps track of the page, line, and column number. You can also move freely around the screen with the "bouncing square" or "blinking line" known as the *cursor*.

Quick — Save Your Edits!

To save what you just typed, you *must* perform a *save command*. The most-often used save command, known as Control-***KS***, will save the entire document with your newly-added lines in the file SAMPLE.TXT, and then return you to editing mode.

To save your file, hold down your Control key and type ***KS***. The computer should access both disks while it saves your document on the disk in drive B (WordStar needs access to system information on the disk in drive A). When it has finished saving your file, WordStar displays the following message:

TO RETURN CURSOR TO POSITION BEFORE SAVE, TYPE ↑QP BEFORE TYPING ANYTHING ELSE.

You have a choice to make here: you can return the cursor to the position it was in before the save operation, or you can start once again with the cursor at the beginning of the file.

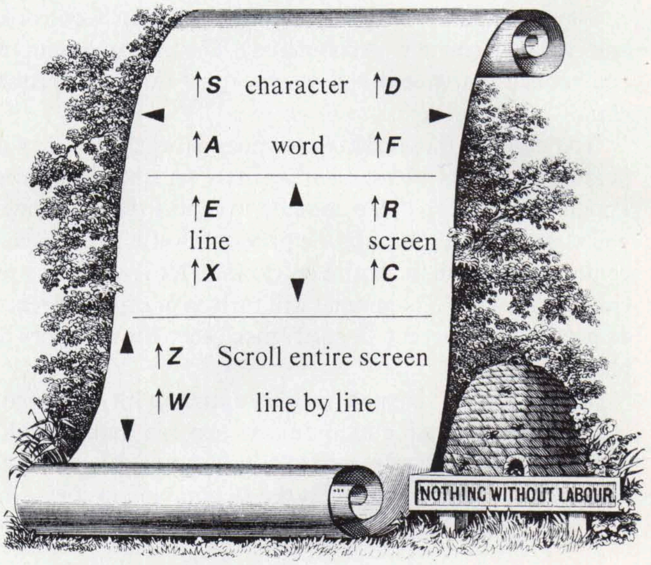
To move the cursor to its former location, hold down your Control key (CTRL, CNTL or ALT on some keyboards) and type ***QP***. (WordStar displays the Control key as an up-arrow: Control-***QP*** is displayed in the message as **↑QP**). If you press any other key combination before typing Control-***QP***, the cursor will start again at the beginning of your text file.

Cursor-ing and Scrolling

The "Cursor Movement" commands are displayed in the main menu on the left side of the display. These commands are also "control sequences" involving use of the Control key (CTRL, CNTL or ALT on some keyboards). The ↑ symbol stands for the Control key.

For example, to move one line up, you'd use the **↑*E*** command — hold down the Control key and press ***E***. To move down one line, hold down the Control key and press ***X*** (perform the **↑*X*** command).

If you have an Osborne computer, or a computer system whose keyboard knows WordStar, you can use the cursor movement (up and down arrow) keys on your keyboard to move the cursor (you don't have to use **↑*E*** or **↑*X***, but they will also work).



NOTE

If you try your cursor movement keys and something else happens, don't panic. Try typing your space bar — this cancels other menus and returns you to the main menu. If that doesn't seem to work, try typing **↑*U*** (Control and ***U***), then press the ESC key.

Try some other cursor movement commands: move one word left (backward) with the **↑*A*** (Control and ***A***) command, and continue moving backward with more **↑*A*** commands. Move one word forward with the **↑*F*** command, and continue moving forward with more **↑*F*** commands.

Try the **↑*S*** command to move one character to the left (backward), and the **↑*D*** command to move one character to the right (forward). If you have an Osborne or similar system whose keyboard knows WordStar, you may be able to use your keyboard's cursor movement (left and right arrow) keys. These commands do not erase characters — they simply move the cursor.

There are other commands that *scroll* the text on your screen. Type the **↑*W*** command to scroll the entire screen down one line, and type the **↑*Z*** command to scroll it back into place again. These scrolling commands do not move the cursor, they just move the WordStar "electronic page."

Two other commands are also known as scrolling commands, but they *do* move the cursor. The ↑***C*** command moves the cursor to the next electronic page of text, and the ↑***R*** command moves the cursor to the previous electronic page.

Try them, and if one command makes all your text disappear, try using its opposite command. For example, the ↑***C*** command might move you too far, but you can use the ↑***R*** command to reverse the direction of scrolling.

In summary, you have just learned how to move forward by character (↑***D***), word (↑***F***), line (↑***X***), or screen (↑***C***), and how to move backward by character (↑***S***), word (↑***A***), line (↑***E***), or screen (↑***R***). You also know how to scroll the entire screen line-by-line up (↑***Z***) or down (↑***W***). You will use these commands often, and they are displayed for you on the left side of the main menu.

Inserting or Typing Over Text

First, look at the top line above the menu, on the right side of the screen, and see if the message **INSERT ON** is displayed (Osborne owners — use your CTRL and arrow keys to move your "window" left or right to see the rest of the menu). If the message is there, you can insert text between words on a line. If there is no message saying that "insert" is "on," use the ↑***V*** command (Control key and ***V***) to *turn on* insert mode.

Now try to insert text: move to any word and type a few letters. The letters will be inserted before the word. Use your RUBOUT or DEL key (on the Osborne computer, you have to hold down your CTRL key and type a dash) to erase the letters you typed.

When you type with insert mode on, WordStar inserts characters *before* the cursor position. WordStar also moves the cursor as it inserts text.

All editing occurs at the cursor location. You can move the cursor around in your text to perform nearly all editing activities. You can insert characters, words, sentences and paragraphs, or delete them, from the location of the cursor.

You can also *type over* existing text to replace it with new text. First, you must *turn insert mode off* by typing the ↑***V*** command (Control key and ***V***). The message **INSERT ON** should disappear after typing the command. Type ↑***V*** again, and the **INSERT ON** message should reappear. The ↑***V*** command is a switch, or "toggle" that turns insert mode on or off.

To type over words, move the cursor to the words you want to type over, turn insert mode off again by typing a ↑***V*** command, and start typing. When you get to the end of the line, however, the line you are typing will wrap around and be inserted before the next line. To type over the next line, use the ↑***G*** command (hold down your Control key and type a ***G***) to erase blanks until the next line jumps up to the line of the cursor.

Deleting Words and Lines

The ↑***G*** command erases the character at the location of the cursor. You can erase everything following the cursor by continually typing the ↑***G*** command. A much quicker way of erasing words is to type the ↑***T*** command (hold down the Control key and type ***T***). Each time you type ↑***T***, a word following the cursor is erased.

To erase an entire line, type the ↑***Y*** command (hold down Control and type ***Y***). Watch out for ↑***Y*** — you can type it by mistake while meaning to type ↑***T*** or ↑***U*** and erase a line you wanted to keep!

An alternative to erasing an entire line: the ↑***QY*** command (hold down Control and type ***QY***) erases a line from the cursor to the end, leaving the text from the cursor to the beginning of the line intact.

Quitting Without Changes

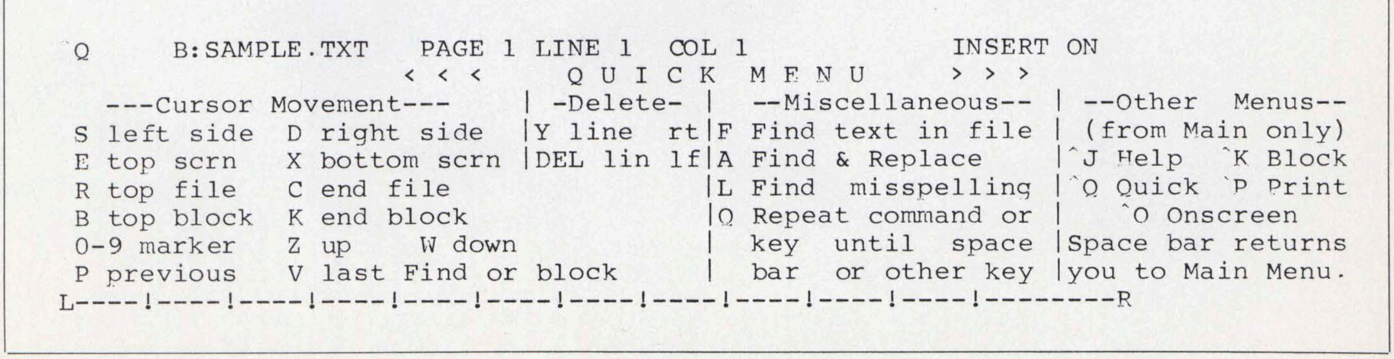
If you erased something you wanted to keep, or if you typed over words and made a mess, don't worry. You used a simple command to *save* your editing changes; you will now use a simple command to *abandon* your editing changes and leave the file exactly as it was after the last save operation.

Type ↑***KQ*** (hold down your Control key and type ***KQ***). The following message should appear:

> **ABANDON EDITED VERSION OF FILE B:SAMPLE.TXT?**
> **(Y/N):**

To quit your untidy editing session and leave the file as it was after your first save operation, type a ***Y*** to answer yes to this question. If you type ***N*** or any other character, the editing session will continue as if nothing had happened.

Type ***Y*** to quit this edit session. WordStar returns you to the no-file menu shown before (figure 1). Type ***D*** to edit a document file, and then type ↑***R*** (hold down Control and type ***R***) to repeat the name of the file you were editing (B:SAMPLE.TXT). Press RETURN, and WordStar starts a new



```
^Q      B:SAMPLE.TXT    PAGE 1 LINE 1   COL 1             INSERT ON
                      < < <      Q U I C K  M E N U       > > >
   ---Cursor Movement---      | -Delete- |  --Miscellaneous-- | --Other  Menus--
 S left side   D right side   |Y line  rt|F Find text in file |  (from Main only)
 E top scrn    X bottom scrn  |DEL lin lf|A Find & Replace    |^J Help   ^K Block
 R top file    C end file                |L Find  misspelling |^Q Quick  ^P Print
 B top block   K end block               |Q Repeat command or |    ^O Onscreen
 0-9 marker    Z up     W down           |  key   until  space |Space bar returns
 P previous    V last Find or block      |  bar   or other key |you to Main Menu.
L----!----!----!----!----!----!----!----!----!----!----!--------R
```

Figure 3. *The quick menu gives you fast cursor movement and text find/replace operations.*

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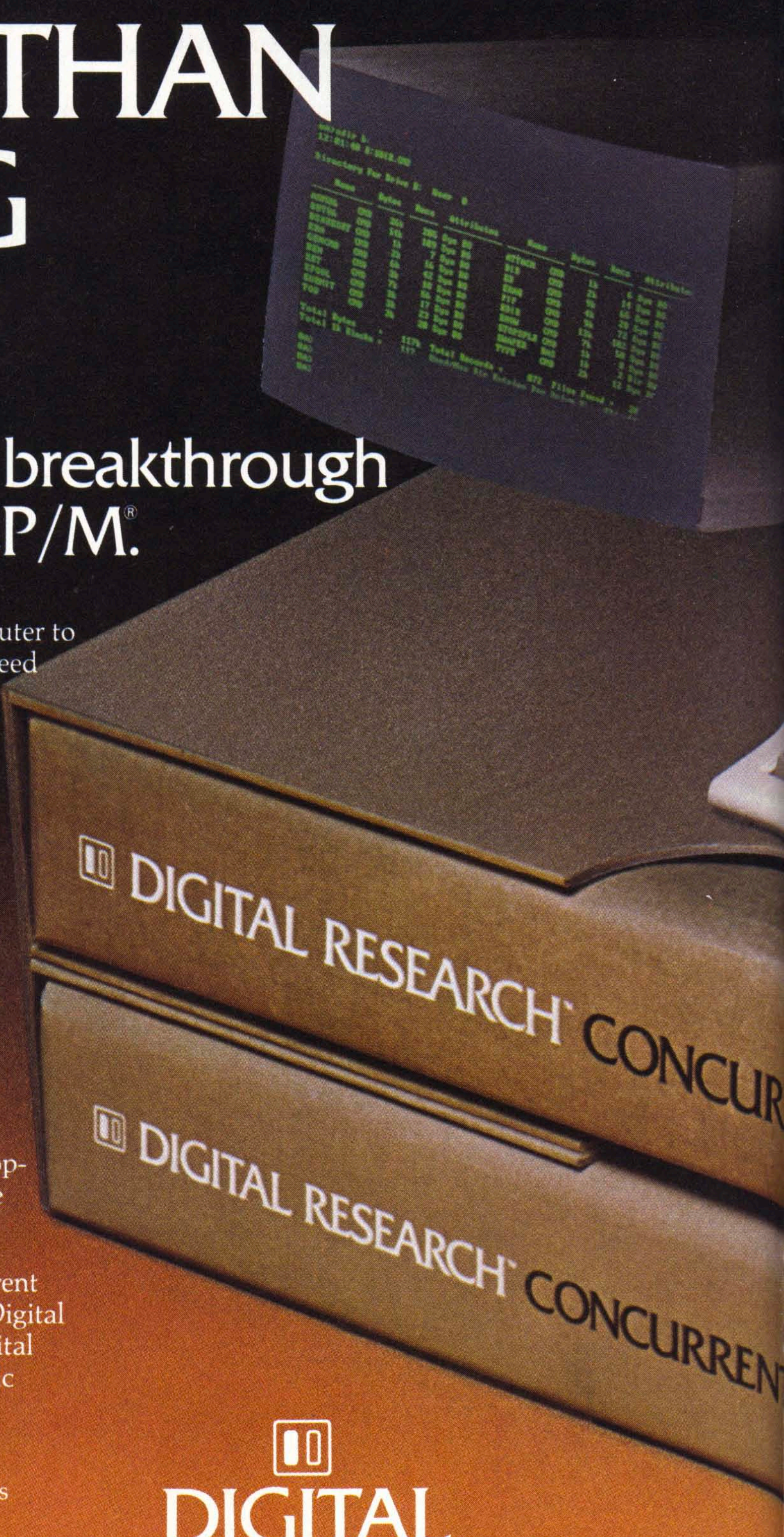

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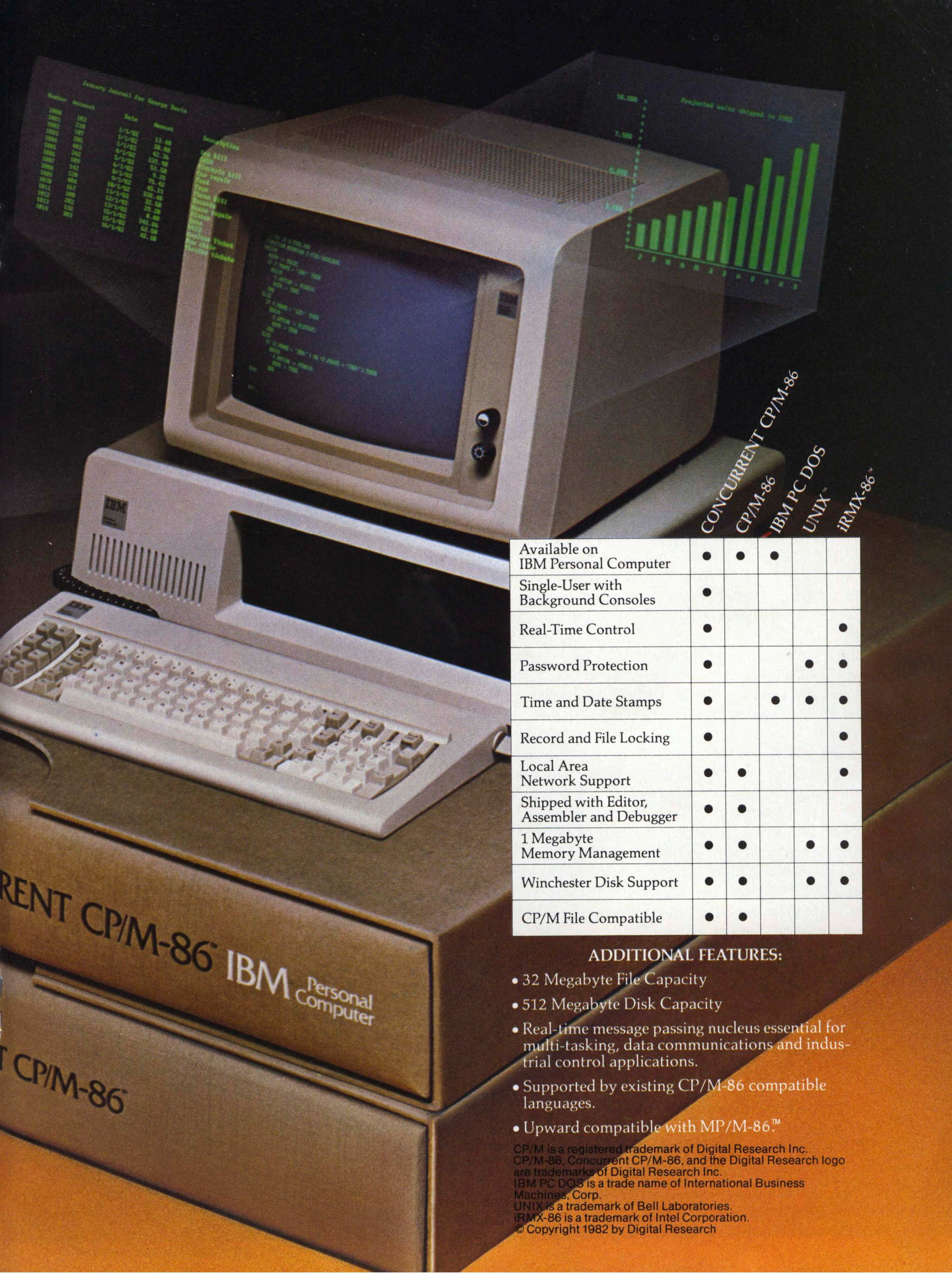

	CONCURRENT CP/M-86	CP/M-86	IBM PC DOS	UNIX™	iRMX-86™
Available on IBM Personal Computer	●	●	●		
Single-User with Background Consoles	●				
Real-Time Control	●				●
Password Protection	●			●	●
Time and Date Stamps	●		●	●	●
Record and File Locking	●				●
Local Area Network Support	●	●			●
Shipped with Editor, Assembler and Debugger	●	●			
1 Megabyte Memory Management	●	●		●	●
Winchester Disk Support	●	●		●	●
CP/M File Compatible	●	●			

ADDITIONAL FEATURES:

- 32 Megabyte File Capacity
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- Real-time message passing nucleus essential for multi-tasking, data communications and industrial control applications.
- Supported by existing CP/M-86 compatible languages.
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editing session with the file.

Quick Cursor Movement

While learning cursor movement commands, you should also learn the *quick* cursor movement commands — versions of the character (↑***D*** and ↑***S***), line (↑***X*** and ↑***E***) and screen (↑***C*** and ↑***R***) commands that move the cursor more quickly to presumed locations. The *quick* commands are shown by first typing ↑***Q*** (hold down Control and type ***Q***), which replaces your main menu with the quick menu (shown in figure 3).

The quick cursor commands are shown in the leftmost column of the menu. ***D*** moves the cursor to the end of a line, ***S*** moves the cursor to the beginning of the line, ***X*** moves the cursor to the bottom of your screen, and ***E*** moves the cursor to the top of your screen. Finally, ***C*** moves the cursor to the end of your text file, and ***R*** moves the cursor to the beginning of your text file.

By typing a ↑***Q*** first, you can use these commands. If you type the commands quickly, as in ↑***QR*** or ↑***QC***, the quick menu will not be displayed but the commands will work. Fast typists like to type ↑***QD*** to move quickly to the end of a line. You can hold down the Control key while typing both the ***Q*** and the quick command, as in ↑***Q***↑***R***, or you can hold down Control for only the ***Q***, as in ↑***QR***.

Use the ↑***QR*** command to move the cursor to the beginning of your text file, and while you do it, notice the ↑**QR** display in the upper left side of your screen. The ↑***Q*** is called a *control prefix* for the entire ↑***QR*** command. Many other commands have a control prefix like ↑***Q*** or another control-command sequence.

WordStar's menus display the command letter after the control prefix in lower case if you are using lower case, and in UPPER case if you are not. We use UPPER case to show all command sequences in this tutorial.

Inserting and Indenting a Line

Move the cursor to the beginning of your text file with a ↑***QR*** command, if you haven't done so already. The file SAMPLE.TXT appears below your text (if you had a SAMPLE.TXT on your disk). If you are creating a new file, your text should appear exactly as you typed it.

The cursor should be highlighting the first column of line one of your text. Move forward three words by using the ↑***F*** command three times, until the cursor is highlighting the beginning of the fourth word on the first line.

Look in the top right corner of your display for the message **INSERT ON**. If this message is not displayed (insert mode is not on), turn on insert mode with the ↑***V*** command.

With insert mode on, press your RETURN key. The cursor, and the rest of the line, should now appear on the next line. Use your TAB key to indent the line with one tab space. The tab space should be equal to the space shown between the **L** and the first **!** in the ruled line above your text. If you typed the last example as shown, your text should now look like this:

```
Won't you try                                                          <
     just a little bit harder,  won't you try just a
little   bit   more?   The  paragraph  keeps  going  and  you  shouldn't
stop  now,  you can't type ESCAPE and you shouldn't type RETURN,
you  can't  go  back  and  you  can't  stand  still,  if  this  word  doesn't
wrap-around the next word will!                                        <
```

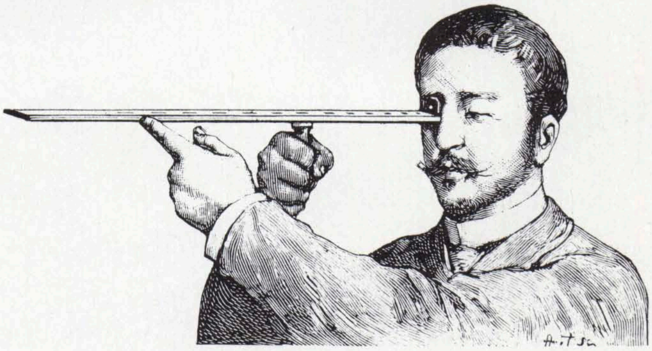
You inserted a RETURN, which puts the first three words on a separate line by themselves — a "paragraph" that is less than a whole line, so it is not justified to the right margin. You also inserted a tab space on the second line with your TAB key.

Now move the cursor to the beginning of the first **just** on the second line, and type the ↑***B*** command to re-form the paragraph following the first line. Always use ↑***B*** after editing a paragraph to justify the paragraph lines properly. Move to a location *before* the editing changes, and type ↑***B*** (hold down Control and type ***B***). The cursor will move to the end of the paragraph.

```
Won't you try                                                          <
     just   a   little   bit   harder,   won't   you   try   just   a   little   bit
more?   The  paragraph  keeps  going  and  you  shouldn't  stop  now,  you
can't  type  ESCAPE  and  you  shouldn't  type  RETURN,   you  can't  go
back  and  you  can't  stand  still,  if  this  word  doesn't  wrap-around
the next word will!                                                    <
```

After using ↑***B***, use ↑***E*** commands (or your cursor movement keys if they work with WordStar) to move up to the second line. Use other cursor movement keys or commands to move to the first character of the word **won't** in the second line.

Press RETURN to insert a RETURN (insert mode should be on; if it is not, move back to the word and type a ↑***V***) and move the rest of the sentence to the next line.



Tab Settings

Tab settings are shown in the ruler line above the text by **!** symbols. The first tab setting is column six, and the second tab setting is column 11.

Before using the TAB key to insert a tab space, change the tab setting by first *clearing* the first and second tab settings. Type the ↑***ON*** command (hold down Control and type ***ON***). This command displays the following message:

```
CLEAR TAB AT COL (ESCape for cursor col, A for all)?
```

If your cursor is sitting on the first letter of the word **just** (column 6, displayed as **COL 06** above the menu), you can press the ESC key to clear the tab setting at the "cursor column" (the column position of the cursor).

Type the ↑***ON*** command again, and this time type ***11*** to clear the tab setting at column 11.

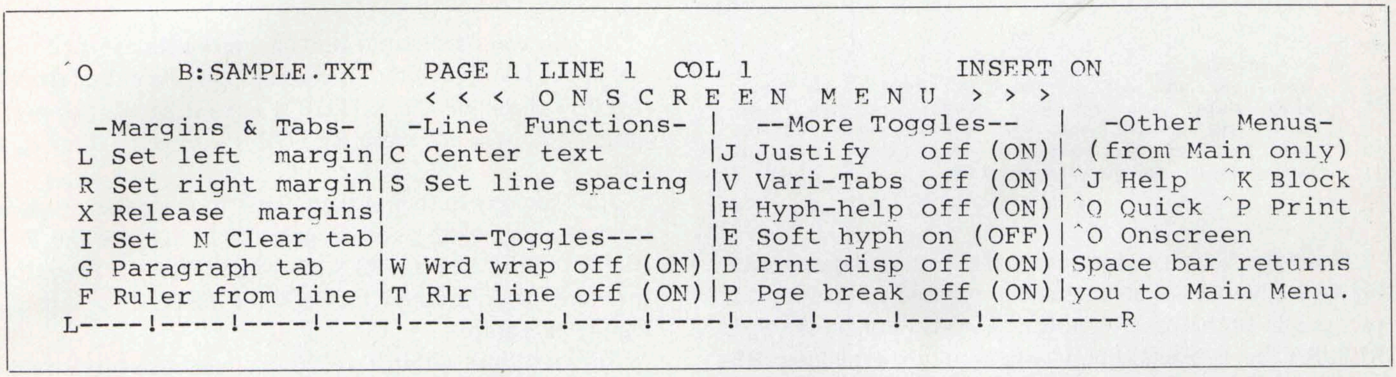
To create a new tab setting, type the ↑***OI*** command (hold down Control and type ***O*** and ***I***), and type a ***9*** for a new tab space at column 9.

Insert a tab space with the TAB key, then use the ↑***B*** command to re-form the rest of the paragraph. Your text should now look like this:

```
Won't you try                                                         <
        just a little bit harder,                                     <
                won't   you   try   just   a   little   bit   more?   The   paragraph
keeps  going  and  you  shouldn't  stop  now,   you  can't  type  ESCAPE  and
you  shouldn't  type  RETURN,   you  can't  go  back  and  you  can't  stand
still,  if this word doesn't wrap-around the next word will!          <
```

Indenting and Re-Forming Entire Paragraphs

Rather than typing tab keys to indent every line of a paragraph, you can use the "paragraph tab" feature. Use the ↑***O*** prefix to select the "On-screen" menu (shown in figure 4).



```
^O      B:SAMPLE.TXT    PAGE 1 LINE 1   COL 1              INSERT ON
                        < < <  O N S C R E E N   M E N U  > > >
  -Margins & Tabs- | -Line  Functions- |  --More Toggles--  |  -Other  Menus-
 L Set left  margin|C Center text      |J Justify   off (ON)| (from Main only)
 R Set right margin|S Set line spacing |V Vari-Tabs off (ON)|^J Help   ^K Block
 X Release  margins|                   |H Hyph-help off (ON)|^Q Quick  ^P Print
 I Set  N Clear tab|   ---Toggles---   |E Soft hyph on (OFF)|^O Onscreen
 G Paragraph tab   |W Wrd wrap off (ON)|D Prnt disp off (ON)|Space bar returns
 F Ruler from line |T Rlr line off (ON)|P Pge break off (ON)|you to Main Menu.
L----!----!----!----!----!----!----!----!----!----!----!--------R
```

Figure 4. *The On-screen menu provides commands to change margins and tabs, to center lines, to set line spacing, to set the justification "toggle" on or off, etc. A "toggle" is a command that turns on a feature if it is currently off, or turns off a feature if it is currently on. The upper case* **ON** *or* **OFF** *in parentheses tells you the current setting.*

In the rightmost column under **Margins and Tabs** is the ***G*** selection (for the ↑***OG*** command). Type a ***G*** and then type a ↑***B***. WordStar re-forms and indents the entire paragraph by one tab space. The indenting is only temporary, and stops at the end of the paragraph (where you marked it with the RETURN key).

If you type two successive ↑***OG*** commands, the paragraph indent will be two tab spaces. Try it: move the cursor to the word "won't" on the third line, and type one ↑***OG*** command, and then another. Now type a ↑***B*** to re-form the paragraph. The paragraph should look like this:

```
Won't you try                                                         <
        just a little bit harder,                                     <
                won't    you    try    just    a    little    bit    more?    The
                paragraph   keeps   going   and   you   shouldn't   stop   now,
                you   can't   type   ESCAPE   and   you   shouldn't   type
                RETURN,   you   can't   go   back   and   you   can't   stand
                still,   if   this   word   doesn't   wrap-around   the   next
                word will!                                            <
```

NOTE

The cursor should stop in the middle of the word **paragraph**. WordStar is asking you if you want a hyphen in that word. For now, simply type another ↑***B*** command to ignore the "hyphen-help" feature and continue re-forming the paragraph. The cursor may also stop on the word **RETURN** for the same reason. Simply type ↑***B*** to continue without hyphenation. The next section explains this "hyphen-help" feature.

You can continue re-forming paragraphs with successive ↑***B*** commands. Each ↑***B*** command re-forms and moves the cursor to the next paragraph (unless it stops for hyphenation).

Hyphen-Help

During the last paragraph re-form (after indenting the entire paragraph with two successive ↑***OG*** commands), you encountered the "hyphen-help" feature of WordStar.

This feature lets you choose to hyphenate words at the ends of lines. WordStar first suggests the location of the hyphen in the word; however, WordStar knows that it is often wrong about the location of the hyphen, so it gives you the ability to place the hyphen anywhere in the word, or to ignore the "hyphen-help" feature entirely.

Move your cursor back to the word **won't** on the third line, type two ↑***OG*** commands, and use the ↑***B*** command to re-form the paragraph.

NOTE

If you forget to type two ↑***OG*** commands in succession, before typing the ↑***B*** command, you will re-form the paragraph to be a regular un-indented paragraph. You can indent the entire paragraph again by moving to the word **won't** on the third line, typing two successive ↑***OG*** commands, and then typing the ↑***B*** command to re-form the paragraph.

WordStar stops the cursor on the word **paragraph** to suggest hyphenation, and displays the following message:

```
TO HYPHENATE, PRESS -. Before pressing -, you may
move cursor: ↑S=cursor left, ↑D=cursor right.
If hyphenation not desired, type ↑B.
```

```
Won't you try                                               <
    just a little bit harder,                               <
        won't  you  try  just  a  little  bit  more?  The  paragraph  keeps
                                                              ↑
```

WordStar is pointing to the second **r** of **paragraph** as a possible place for a hyphen (to improve the line's appearance when it is justified). WordStar is not the smartest copy editor — it tries to find the syllable boundaries in long words that appear near the ends of lines. WordStar may not see the obvious place to hyphenate.

WordStar points at the letter that will occur *after* a hyphen, if you choose to hyphenate. WordStar also gives you the ability to move the cursor to a *better* hyphenating location, using the ↑***S*** (move left a column) and ↑***D*** (move right a column) commands. Since **paragraph** should be hyphenated between **para** and **graph**, you must move the cursor one column to the left (using the ↑***S*** command).

After moving the cursor to the left by one letter (using ↑***S***, you can type a hyphen (the **-** key on your keyboard) and WordStar will insert a hyphen and continue re-forming the paragraph.

If you followed these directions correctly the paragraph should now look like this:

```
Won't you try                                                 <
    just a little bit harder,                                 <
        won't   you   try   just   a   little   bit   more?   The   para-
        graph   keeps   going   and   you   shouldn't   stop   now,   you
        can't   type   ESCAPE   and   you   shouldn't   type   RETURN,
        you   can't   go   back   and   you   can't   stand   still,   if
        this word doesn't wrap-around the next word will!             <
```

If you don't want to hyphenate the word **paragraph**, simply type another ↑***B*** command to continue re-forming the paragraph. In this case, WordStar will also stop on the word **RETURN** for hyphenation. If you want to hyphenate **RETURN**, you can type the hyphen at the cursor position. If you don't want to hyphenate the word, simply type another ↑***B*** command.

More on Hyphens:

In case you want to know, the hyphens you type during "hyphen-help" are known as *soft* hyphens. A *soft* hyphen is a hyphen that is only printed if it is needed; that is, if you reformed a paragraph with soft hyphens, the soft hyphens would only be printed if they end up at the ends of lines during a paragraph re-form.

On most CRT screens, soft hyphens are displayed in half the intensity as regular characters. On some CRT screens, soft hyphens are displayed in twice the intensity, or reversed (black hyphen on white or green background).

A *hard* hyphen is one you type as part of your text, and it is *always* there unless you delete it. For example, the hyphen in the word **wrap-around** in the sample paragraph is a hard hyphen that will always be displayed and printed. Hard hyphens are displayed as regular characters.

The soft hyphen separating the word **paragraph** into **para** and **graph** will print as a hyphen if you print the file as it is at this moment. If you re-form the paragraph so that the word **paragraph** does not fall at the end of a line, WordStar will display the soft hyphen (to let you know it is still there), but not print the soft hyphen.

NOTE

If you're using a version of WordStar earlier than version 2.0, soft hyphens are printed as ↑↑ or ↑-. This problem is not supposed to occur in version 2.0 or later versions.

You can *turn off* the "hyphen help" feature by typing the ↑***OH*** command.

Split/Join Paragraphs

To split a paragraph into two paragraphs, move the cursor to the position where the split should occur, and type the ↑***N*** command. This command inserts a RETURN and splits the paragraph into two paragraphs, leaving the cursor at the end of the first paragraph. From this position you can use ↑***B*** to re-form the last line of the first paragraph.

The ↑***B*** command moves the cursor to the beginning of the next paragraph. Be sure that insert mode is on (↑***V*** turns insert mode on or off), and then press the TAB key to indent this paragraph. Finally, use the ↑***B*** command to re-form the paragraph.

To join two paragraphs into one, move the cursor to the end of the last line of the first paragraph. Type the ↑***G*** command to eliminate the RETURN separating the two paragraphs (if there are more RETURNS, type a ↑***G*** for each one).

Another way to join paragraphs is to move the cursor to the beginning of the second paragraph, and use the RUBOUT or DEL key (CTRL and **-** on the Osborne keyboard) to delete the preceding RETURN (or RETURNs) separating the paragraphs.

To insert lines within a paragraph, move the cursor to the position to insert the lines, be sure that insert mode is on (↑***V*** turns insert mode on or off), and type the lines (without RETURN keys). As a line extends past the right margin, a + sign on the far right side of the screen tells you that the line extends past the right margin. When you are finished typing the inserted lines, move the cursor to a position in the paragraph before the inserted lines, and use the ↑***B*** command to re-form the paragraph.

Save/Resume, or Save/Exit

To continue on to lesson two, type ↑***KS*** again to save the editing changes you just made. This command will return you to editing mode with the same file to edit for lesson two.

To stop now and do lesson two at some other time, type ↑***KX***. This command saves your editing changes *and* leaves WordStar altogether. You return to CP/M and the familiar **B**> prompt, since the B: drive was the "logged" drive (you would see the **A**> prompt if drive A was your "logged" drive).

A summary of file saving commands follows the summary of lesson one.

Lesson One Summary

Starting WordStar: The ***B:WS***↵ command from CP/M's drive B: to use B: as the "logged" drive, or ***WS*↵** from drive A and change the "logged" disk to drive B with WordStar's ***L*** command. To use A: as the "logged" drive, simply type ***WS*↵** from drive A.

Copying a file using WordStar: ***O*** (not zero) from the WordStar no-file menu to copy a file from one disk to another, or from one file to another by another name.

Creating or editing a document: ***D*** from the no-file menu to create or edit a document file. You type the name of a file, which WordStar will either find (if it already exists), or create (if it doesn't already exist).

Edit command lines: ↑***S*** to move back one space and erase the last character typed, ↑***D*** to restore last character typed at the cursor location, ↑***Y*** to erase the entire entry, ↑***R*** to restore the previous entry, ↑***U*** command to cancel the command or operation and return to the no-file menu, and ↑***F*** to turn on or off the directory display of your current "logged" disk.

Create a blank line: ↑***N*** to insert a line and keep the cursor on the previous line, or the RETURN key to add a blank line and move the cursor to that line.

End paragraphs: the RETURN key, also used to end lines that do not reach the right margin.

Erase mistakes: DEL or RUBOUT key to erase the previous character or characters, even past the beginning of a line. (Osborne computers do not provide a DEL or RUBOUT key — use ↑-.)

Cursor movement: ↑***D*** to move forward by character, ↑***F*** by word, ↑***X*** by line, and ↑***C*** by screen "page;" ↑***S*** to move backward by character, ↑***A*** by word, ↑***E*** by line, and ↑***R*** by screen "page."

Scrolling: ↑***Z*** to to scroll the entire screen up, and ↑***W*** to scroll down.

Insert mode: ↑***V*** is "toggle" that turns insert mode on or off.

Erasing: ↑***G*** to erase the character at the cursor, ↑***T*** to erase a word following the cursor, ↑***Y*** to erase an entire line, ↑***QY*** to erase from the cursor to the end of the line.

Cancel a command or operation: ↑***U***, then press the ESC key.

Quick cursor movement: ↑***QD*** to move the cursor to the end of a line, ↑***QS*** to the beginning of the line, ↑***QX*** to the bottom of the screen, ↑***QE*** to the top of the screen, ↑***QC*** to the end of the file, and ↑***QR*** to the beginning of the file.

Indent: TAB key to indent with one tab space.

Re-form paragraphs: ↑***B*** to re-form after editing to justify the paragraph lines properly. Move to a location *before* the editing changes, and type ↑***B*** The cursor moves to the end of the paragraph.

Tab settings: ↑***ON*** to clear a tab setting, ↑***OI*** to set a tab. Both ask you for a column number or ESC to clear or set the tab at the column of the cursor.

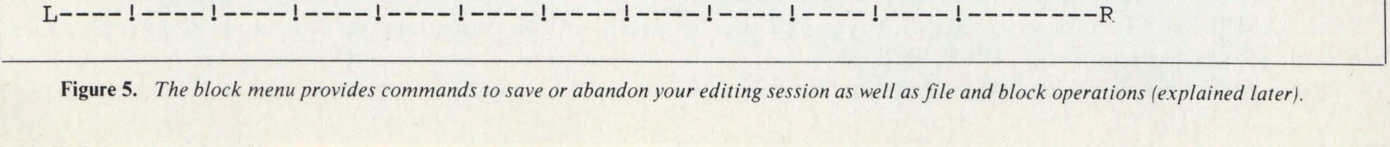
Paragraph indent: ↑***OG*** to indent the entire paragraph by one tab space. Type an ↑***OG*** for each tab space to indent by, and use ↑***B*** from the beginning of the paragraph to re-form and indent the paragraph.

Hyphen-help: The cursor sits on the letter that will occur *after* a hyphen, if you choose to hyphenate the word. You can use ↑***S*** to move left a column and ↑***D*** to move right a column, to position the cursor for a better hyphen location in the word. Type a dash to insert the "soft" hyphen. Soft hyphens are only printed if they occur at the end of a line. If a paragraph is re-formed to place it elsewhere, it will be displayed but not printed.

Split paragraphs: Move the cursor to the position where the split should occur, type ↑***N***, then type ↑***B*** to re-form the last line of the first paragraph. With cursor at the start of the next paragraph, you can insert a tab space with the TAB key, and use the ↑***B*** command to re-form the second paragraph.

Join paragraphs: Move the cursor to the end of the last line of the first paragraph, and type the ↑***G*** command to eliminate the RETURN separating the paragraphs.

Save editing changes and return to edit: ↑***KS*** to save the document and return to editing mode. Move the cursor to its former location by typing ↑***QP***. To start once again at the beginning, press the ESC key.



```
^K      B:SAMPLE.TXT    PAGE 1 LINE 1   COL 1           INSERT ON
                        < < <      B L O C K  M E N U       > > >
 -Saving  Files- | -Block Operations- |  -File Operations- |   -Other  Menus
 S Save & resume | B  Begin  K  End   |R  Read    P  Print |  (from Main only)
 D Save--done    | H  Hide / Display  |O  Copy    E  Rename | ^J Help   K Block
 X Save & exit   | C  Copy   Y  Delete|J  Delete           | ^Q Quick ^P Print
 Q Abandon file  | V  Move   W  Write | -Disk  Operations- | ^O Onscreen
 -Place  Markers-|N  Column  on (OFF) |L Change logged disk| Space bar returns
0-9 Set/hide 0-9 |                    |F Directory on (OFF)| you to Main Menu.
L----!----!----!----!----!----!----!----!----!----!----!----!--------R
```

Figure 5. *The block menu provides commands to save or abandon your editing session as well as file and block operations (explained later).*

Quit and abandon editing changes: **↑KQ**, then **Y** to quit editing mode and leave the file as it was after the last save operation.

Save editing and leave WordStar: **↑KX** saves your editing changes *and* leaves WordStar altogether, returning you to CP/M.

Saving or Abandoning an Editing Session

Type **↑K** (Control and **K**), and you will see the block menu shown in figure 5.

In the column **Saving Files**, you have several choices. You can save and resume editing as you did before, by typing an **S** (you already typed the **↑K** prefix to display the menu).

You can also choose to save and be done with the file. Type **D** (the command sequence, from the main menu, is **↑KD**). This choice returns you to the no-file menu, from which you can pick several major options: edit any file, print any file, perform MailMerge or SpellStar operations, execute CP/M commands, or perform file operations.

Another choice is to save and exit WordStar to return to CP/M. Type **X** (the command sequence, from the main menu, is **↑KX**). People choose this option for either of two reasons: they really want to leave WordStar, or they want to *reset all settings to their original start-up values*.

For example, if in an editing session you changed the margins, tab settings or other items from the on-screen menu, you can instantly change them back to their original values by leaving WordStar and starting WordStar again from CP/M. You can do this and save the file at the same time with the **↑KX** command.

If you do a lot of text editing, you will want to save your editing changes every twenty minutes or so. Why? If your computer fails during an editing session, chances are you will lose the editing changes you made during that session (your file will be as it was before the editing session). By performing a save operation every twenty minutes, you are making sure that if the system fails you would only lose twenty minutes worth of editing.

The last choice (**↑KQ**) abandons all editing changes since the last time you saved your text file. If you created a new file and typed new text, yet chose the **Q** option (**↑KQ** command), the new file would be abandoned and not saved.

If you made mistakes in your editing and you wanted to try over again, the **↑KQ** command throws away your mistaken editing changes, and leaves the file on disk untouched. This feature is especially useful if you did something terrible during an editing session.

Backup Files

Every time you save (with either the **↑KS**, **↑KD**, or **↑KX** commands), your newly-edited text is saved under the original name (SAMPLE.TXT), and a backup file holds the text as it was before the editing session (SAMPLE.BAK). Thus, the old SAMPLE.TXT becomes SAMPLE.BAK, and the newly-edited version becomes SAMPLE.TXT.

What happens on disk can be explained simply: WordStar renames the original text file (SAMPLE.TXT) to have a ".BAK" extension (SAMPLE.BAK), and renames its temporary "work" file (holding the edited version) to the name of the original text file (SAMPLE.TXT).

On the "logged" disk, WordStar maintains the original file, the former backup file (from the previous editing session, unless you erased it), and a temporary "work" file at the same time. The total space occupied is three times the size of the original file.

If you choose to abandon your edits with the **↑KQ** command, a ".BAK" file is not created, and your original file remains untouched. For example, if you abandon the edit session for SAMPLE.TXT, SAMPLE.TXT remains untouched (if there existed a SAMPLE.BAK from previous editing sessions, it is also untouched).

If you want to save your editing session, but you also want to keep a copy of the file as it was before you made the changes, you have a copy: the ".BAK" file. For example, if you saved your editing in SAMPLE.TXT, you would still have the previous version of the file in SAMPLE.BAK.

However, to preserve your ".BAK" file, *rename it immediately* to have an extension other than ".BAK." To rename a file, use the **↑KE** command from the main menu, or pick the **Rename a file** option (**E**) from the no-file menu.

Never try to edit a file that has a ".BAK" extension. You will not be able to save it as a ".BAK" file (the old version will be stored in the ".BAK" file). This rule should never be broken. If you want to edit a ".BAK" file, you must rename it first to have an extension other than ".BAK" (".TXT" is preferred).

For example, if you want to edit SAMPLE.BAK (and not disturb the newly edited SAMPLE.TXT), rename SAMPLE.BAK to something like SAMBAKUP.TXT, or OLDSAMPL.TXT, and then edit the file.

LESSON TWO:
Preparing For Printing

WordStar allows you to form a document on your screen, and have it look exactly the same way in print. WordStar also has a few special effects available for your printed document, like underlining, bold-printing, double-printing and overprinting, subscripts and superscripts, line spacing and pause marks in the text to temporarily halt the print operation (to change a print wheel or ribbon, etc.).

Most of these special features will work with daisy-wheel and dot-matrix printers. You should find out from your dealer which features are available in your setup.

Printing a document can be very easy if you leave settings alone and use the "default" settings, which are set for standard 8.5 x 11 inch paper. Your left and right margins will be exactly as shown on the screen. Your page breaks will occur as shown by the page break display (row of dashes) on your screen. Pages will be numbered consecutively from a starting number you can supply when you start the print operation.

However, you can also choose your own settings and control your own pagination, vertical and horizontal placement on the page, character pitch, and paper length. You can change the page number placement (by default, the page number is printed at the bottom center of the page). You can also add *headings* (or "headers") and *footings* (or "footers") that include page numbers (in order to print chapter and page numbers, as in "2-4" for Chapter 2, page 4).

To use print settings other than defaults, and to add headings and footings, you have to use the *dot commands* To use special effects like underlining and boldface, you use the *print controls*

What are the differences? *Print controls* are the controls and toggles shown in the print menu displayed by typing ↑***P***. These controls can be entered into your document as you type the text. *Dot commands*, on the other hand, are page formatting controls that must start with a period ("dot") in column 1.

Typical newcomers to WordStar find use for some of the print controls (underlining, boldface, superscripts and subscripts), and practically none of the dot commands (possibly "conditional paging" and "paper length"), until they've learned to use WordStar and are familiar with dot commands.

Parameters most often changed are margins, justification, hyphenation and line spacing. Features most often used are underlining, double-striking, bold-printing, superscripts (for trademarks and footnotes) and subscripts.

Since WordStar lets you change printing parameters at any time, you don't have to set margins exactly the way you want them before writing or editing. Most changes for printing can occur at the last minute without too much difficulty. The settings you should use while writing or editing are:

- Underlining, bold-printing or double-printing text.

- Superscripts, subscripts and other special effects.

These printing effects act on specific words or characters within the text, and they require that you type special characters before and after the words or characters used with the effects.

Other settings can be set at any time, but should be set as soon as you know what you want, since they may require that you re-form the paragraphs using the ↑***B*** command:

- Changing margins from their on-screen settings. Margin changes for the entire file require that you re-form every paragraph.

- Line spacing, which is usually single-spaced. To change the entire file to double-spaced for printing, you must change the setting and re-form every paragraph.

- Centering lines of text between the left and right margins. Wait until you've finalized your margin settings, then use the ↑***OC*** command to center each line.

- Justification of lines to the right margin. After you've finalized your margin settings, be sure to decide also whether to justify your lines to the right margin, or fill them out as ragged-right lines. While justifying or filling out, you can turn on the "hyphen-help" feature, or turn it off for no hyphenation.

Examples of Dot Commands

If you have the supplied example file SAMPLE.TXT on your screen (from lesson one), you probably noticed that the first lines of the file (following your newly-typed paragraph from lesson one) contain strange WordStar commands:

```
.op
.pl 67
```

These are *dot commands* because they start with a "dot," or period, in column one. WordStar does not treat them as regular text — it sees the period in column one, and expects to find a dot command on that line, or a special WordStar comment.

Try it: type a period in column one of a blank line. You should see a question mark (**?**) on the far right side of the screen on that line. WordStar is questioning your move — are you about to type a dot command? If not, are you going to type more periods to form a WordStar comment? If you are doing neither, then you are probably making a mistake. Erase your period from column one.

The ***.OP*** command tells WordStar to omit page numbers when printing the file. Ordinarily, WordStar prints a page number at the bottom of the page, in the center.

The ***.PL*** command tells WordStar the number of lines that can fit on a single printed page. The page length is set to 67 lines to fit the entire SAMPLE.TXT on one page; however, normal 11-inch paper will only hold at most 66 lines.

Ordinarily, WordStar prints 55 actual lines, with an extra three blank lines at the top and eight at the bottom, for a total of 66 lines. WordStar then advances the printer to the next page.

NOTE

Next to the **.pl 67** command there may be a message from WordStar telling you to put something at "file beginning" for the "correct page break." WordStar expects any ***.PL*** command to be in the first few lines of the file, and we had you inserting text in lesson one that caused WordStar problems with the misplaced ***.PL*** command.

You can get rid of the **.pl 67** command entirely, since you've added to the SAMPLE.TXT file enough text for two pages. Move your cursor to the dot command line and type ↑***Y*** to erase the line.

Examples of Print Controls

The first line of text (after the dot commands) is *centered* between the margins:

```
                    ↑BSAMPLE TEXT↑B

↑SWordStar↑S is a CP/M-compatible screen-oriented word
```

The ↑**B** and ↑**S** characters are *print controls* from the print menu. ↑**B** is used to *turn on* bold-printing, and the second ↑**B** turns bold-printing *off*. Likewise, ↑**S** turns on underlining, and the next ↑**S** turns it off.

How do you know they are print controls, and not ordinary letters preceded by the up-arrow symbol? Try this: type ↑***OD*** (hold down Control and type ***OD***). All print control characters should disappear. All soft hyphens should also disappear.

You'll notice also that when the print controls are *not* displayed, the line that contains them is justified to the right margin as all other lines. Type the ↑***OD*** command again, and the print controls (and soft hyphens) reappear. Also, lines containing print control characters seem to extend past the right margin.

The print control characters are not printed — they control printing, or the turning on or off of special printing effects. The lines containing the print control characters will be justified as they appeared when the ↑***OD*** command made the print controls disappear. You can, however, select an option to print them and not use them to control printing.

Underline, Boldface, Double-face

To underline text, you insert a ↑**S** before the text and another ↑**S** after the text to turn off the underlining. To insert these characters, type ↑***PS*** The ↑***P*** by itself displays the menu of print controls, and the ***S*** selects the underlining, known as "underscoring."

WordStar does not underline the spaces between words, or any spaces. To underline a space, type the underscore character on your keyboard. For example, you can underline the title **SAMPLE TEXT**, and also underline the space between the words, by typing:

↑***PS***↑**BSAMPLE_TEXT↑B**↑***PS***

In this example we type ↑***PS*** before the entire title to start underlining, the underscore character (_) between the words, and another ↑***PS*** after the title to stop underlining. The result is that the title **SAMPLE TEXT** will be both underlined *and* in boldface:

↑S↑BSAMPLE_TEXT↑B↑S

To enter any print control, you type the ↑***P*** prefix first. This prefix by itself displays the menu of print controls. See figure 6.

For boldface words, type ↑***PB*** before and after the word. Some people prefer the look of double-printing, which prints the letters twice to add boldness, over bold-printing, which prints the letters several times in a slightly skewed fashion to increase the thickness of each letter. For double-printed words, simply type ↑***PD*** rather than ↑***PB***.

Superscripts and Subscripts

The ↑***PT*** command turns on superscript mode to print superscripts like "TM" or "R" for trademarks. The following example shows how to add a "TM" superscript to the word **WordStar**:

WordStar↑*PTTM*↑*PT*

After typing, the word should look like this:

WordStar↑TTM↑T

By typing ↑***PT*** before typing ***TM***, you place a "TM" one-half line above the word **WordStar**. You stop superscript mode by typing another ↑***PT*** after the ***TM***; otherwise, printing continues at one-half above the line until WordStar encounters another ↑**T** in the file.

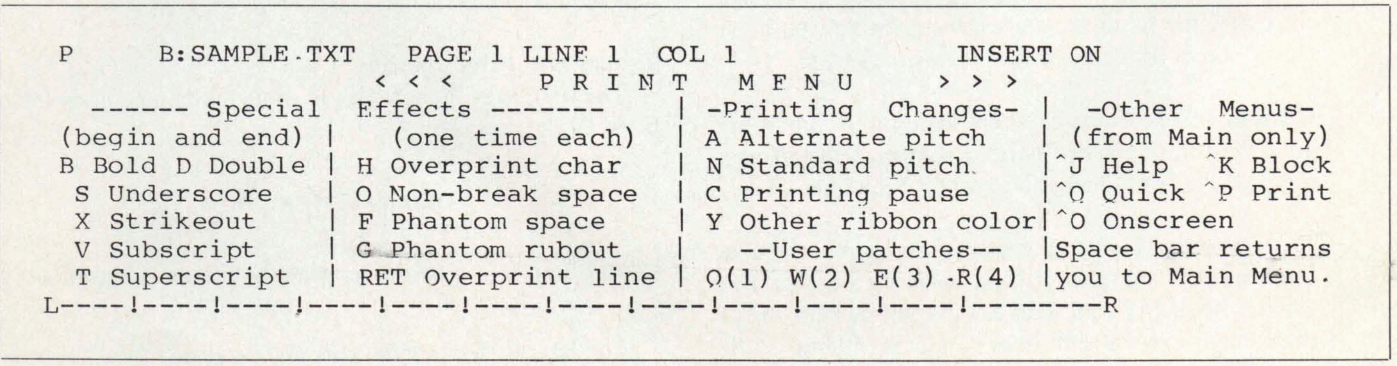
Subscripts are similar. You type ↑***PV*** before the subscripted letters or digits, and then type ↑***PV*** to turn off subscript mode.

Other printer controls include a ribbon color on/off switch (if your printer has a ribbon color selection), and a printer pause control to allow an operator to change a ribbon or type wheel. These controls are similar: you type the ↑***P*** prefix first, then the print control letter, at the location where you want the different color ribbon, or the printer to pause while you make changes. If you insert a pause with the ↑***PC*** command, the printer will pause at that location, and you must type a ***P*** to continue the print operation (described later in this lesson).

More advanced printer controls, to be described in another lesson, are: alternate pitch for daisy-wheel printers, "phantom" spaces and rubouts for daisy-wheel printers that have special graphic characters assigned to these "phantom" selections, a "non-break" or fixed space that cannot be broken or added to for line justification, overprint ("overstrike") controls, and controls that can be defined by a programmer ("user patches").

Changing Right and Left Margins

WordStar automatically chooses a left margin at column



```
 P      B:SAMPLE.TXT    PAGE 1 LINE 1   COL 1              INSERT ON
                     < < <     P R I N T   M E N U     > > >
   ------ Special  Effects -------       | -Printing  Changes- |  -Other  Menus-
 (begin and end) |   (one time each)     | A Alternate pitch   | (from Main only)
 B Bold D Double | H Overprint char      | N Standard pitch    |^J Help   ^K Block
  S Underscore   | O Non-break space     | C Printing pause    |^Q Quick ^P Print
  X Strikeout    | F Phantom space       | Y Other ribbon color|^O Onscreen
  V Subscript    | G Phantom rubout      |   --User patches--  |Space bar returns
  T Superscript  | RET Overprint line    | Q(1) W(2) E(3) R(4) |you to Main Menu.
L----!----!----!----!----!----!----!----!----!----!----!--------R
```

Figure 6. *The printing effects menu, displayed by typing* ↑***P*** *(Control key and* ***P****).*

1 and a right margin at column 65, allowing 65 characters or spaces per line.

Column one on your display does *not* correspond to the edge of the printed page. WordStar automatically moves the printer's printing element eight columns (approximately 4.5 inches) to the right before starting to print a line.

This is called the *page offset* and can be changed with the ***.PO*** dot command. The default page offset is set so that a 65-character line would be centered within appropriate paper margins (this is a standard setup for 8.5 x 11 inch paper used for documents in most computer printers).

There are three commands that perform typical typewriter functions: set right margin, set left margin, and release margins. Although right margins are set and changed frequently, the left margin is seldom reset from column 1 (as a typewriter's left margin is usually the same every time). The margin release lets you type text in areas outside of the margins without causing wrap-around.

To change the right margin, type the ↑***OR*** command (↑***O*** by itself displays the menu of on-screen settings). You then have the option of typing a column number for the right margin, or using the column location of the cursor as the column for the margin by pressing the ESC key:

```
RIGHT MARGIN COLUMN NUMBER (ESCAPE for
cursor column):
```

You can type a column number and press RETURN, or press the ESC key to use the current cursor position as the column for the right margin. To re-form the already-typed paragraphs, move the cursor to the beginning of each one and type ↑***B*** commands. New paragraphs you type will be formed automatically.

To change the left margin, use the ↑***OL*** command and either pick a column number and press RETURN, or press the ESC key to use the current column position of the cursor.

One common problem: you forgot to move the cursor to the desired location for the margin, and you don't know how many columns (characters and spaces) you want on a line. You can't press the ESC key, unless your cursor is in a good column for the margin. What do you do?

You can back out of nearly every WordStar command with a ↑***U*** command. The ↑***U*** command interrupts the previous command and displays a message telling you to press the ESC key. Press the ESC key to return to the main menu, and then move the cursor to the desired location before typing the margin command.

If you move the left margin in from column one, WordStar simply inserts spaces before the text to justify lines to the new left margin. These spaces are known as "soft" spaces — spaces WordStar can find and delete, or add to, while re-forming the paragraph. "Hard" spaces are ones you specifically type between words and sentences.

The right margin is actually the number of characters and spaces permitted on a line (minus the left margin column number, if not 1). At the end of each line, WordStar inserts a "soft" *carriage return* character that moves the cursor to the beginning of the next line.

A "soft" carriage return is one WordStar can find and delete, or add, as it goes about re-forming the paragraph. A "hard" carriage return is one you insert by pressing the RETURN key, to mark the end of paragraphs (and "hard" lines). "Hard" carriage returns are not deleted by WordStar — you type them, and they stay there unless you delete them.

Other On-screen Settings

The on-screen menu shows the screen display settings, which are also print settings. The settings are grouped into the columns **Margins and Tabs**, **Line Functions**, **Toggles** and **More Toggles** (see figure 3). For help messages on these topics, type the ↑***J*** command to display the help menu.

A "toggle" in computer jargon is an on/off switch. For example, the ↑***V*** command is the insert mode switch, or toggle, that turns insert mode on or off like a light switch. For each toggle selection in the on-screen menu, the **ON** or **OFF** in capitals and enclosed in parentheses is the current toggle switch setting. If a toggle is **OFF**, you type the command again to turn it **ON**, and vice-versa.

Right Margin Justification

The justification toggle turns justification on or off. When justification is on, lines that do not end with a "hard" RETURN are filled with spaces if necessary in order to end flush with the right margin. When justification is off, lines end with a slightly ragged right margin. In both cases, lines still wrap around within paragraphs.

WordStar starts with justification on. You can choose one, and if you change your mind later, type the ↑***OJ*** command to "flip the toggle," and re-form your paragraphs with the ↑***B*** command.

"Hard" (Unjustified) Lines

There are times when you have lines of text that do not reach the right margin, or are not supposed to be justified to the right margin, even though other paragraphs around it are to be justified.

Such lines are sometimes called "literal lines" or "hard lines." Examples would be the salutations and closings in correspondence, lines of poems and songs, free verse, graphic images drawn with alphanumeric characters and symbols, etc.

In all cases there is one common desire: to display or print the line exactly as typed, with no extra spaces added for justification, and no line wrap-around to confuse the exact lines as typed.

With WordStar, you form these lines by simply typing the line and pressing the RETURN key. Each line becomes its own "paragraph" that is only justified to the left margin. If you want to indent a line, simply use the TAB key (or add spaces with the space bar). Here's an example of typing poetry:

```
"It cannot be seen, cannot be felt↵            <
Cannot be heard, cannot be smelt,↵             <
It lies behind stars and under hills↵          <
And empty holes it fills."↵                    <
↵                                              <
J.R.R. Tolkien,↵                               <
Lord of the Rings↵                             <
```

Each line is treated as a separate paragraph; therefore, ↑**B** commands will only move the cursor line by line.

Blank lines are also treated as separate paragraphs, each ending with a RETURN. Blank lines do not take up extra space on disk — they only occupy the space needed to hold the codes for the RETURN keys.

Centering Lines

To center lines of text between margins, move the cursor to the line to be centered, and type the ↑**OC** command. The line should be perfectly centered between the left and right margins. WordStar simply adds spaces to center the line appropriately.

If, at a later time, you wish to change the right margin and center the text within the new margin boundaries, use the ↑**OC** command to center the line again.

To underline a centered headline with a line of dashes, first type the headline and a line of dashes underneath it that is exactly the same length. Move the cursor back to the headline, and use the ↑**OC** command to center the headline. Move the cursor down to the line of dashes, and use another ↑**OC** command to center this line. Both lines should be centered between the margins.

Page Break Display

If you move the cursor ahead in the SAMPLE.TXT file (using ↑**C** commands), you probably encountered the line of dashes ending with a **P** in the far right side of the display. This line does not really exist in your file — it is the *page break* display. A WordStar "page" is 55 lines, which corresponds to standard 8.5 x 11 paper in which the text fits roughly within a one-inch border.

The printed page is simulated on your screen, with page breaks as shown. The page breaks will not occur in printing if you've turned them off with a ↑**OP** command.

For your convenience in figuring the amount of text on a page, this display is kept on unless you turn it off with a ↑**OP** command. When you turn it off, the **PAGE n LINE n COL n** display is changed to **FC=cccc FL=nnnn**, where **cccc** is the number of characters (bytes) in the file, and **nnnn** is the number of lines in the file.

Line Spacing

You can change the line spacing in your document to double-spaced lines, triple-spaced lines, etc. The line spacing you choose is automatically used as you type new text or re-form existing paragraphs. The ↑**OS** command asks for a number. You type ***2*** for double spacing, ***3*** for triple spacing, etc. To reset it back to single spacing, type the ↑**OS** command and ***1*** for single-spaced lines.

Variable or Fixed Tabs

You can use the TAB key to move the cursor to the next tab stop, which is helpful for indenting lines or aligning columns of a table. Each regular tab stop is marked by a **!** in the ruler line above your text.

WordStar allows you to set and reset tab stops as you would do on a typewriter, but only if you use *variable tabbing*. WordStar uses spaces to fill the space created by the TAB key in variable tabbing mode. When variable tabbing is off, *fixed tabbing* is in effect, where each tab space is actually the ↑**I** (tab) character, with fixed stops every eight columns.

Variable tabbing is turned on or off with the ↑**OV** command. We suggest that you use variable tabbing in most documents, and only use fixed tabbing when typing program statements into source files.

When variable tabbing is on, you can use several commands to set and reset tabs stops. The ↑**OI** command (or ↑**O** and the TAB key) sets a tab stop at a specific column number:

```
For decimal tab stop enter "#" and decimal point
column
SET TAB AT COLUMN (ESCAPE for cursor column)?
5↵
```

You can type the column number followed by RETURN (as shown), or type **#** and the column number for a *decimal point tab* (described next), or press the ESC key to use the cursor column as the tab stop.

The ↑**ON** command clears a tab stop in the same way — by column number or cursor column — and also lets you type ***A*** to clear *all* tabs stops at once.

Decimal point tabs are useful for typing columns of numbers with their decimal points aligned, or for typing any text that needs to be right-aligned to a tab stop. After using the TAB key to move to a decimal point tab stop, you can type digits or characters that will be moved to the left from the tab stop, while the cursor remains at the tab stop.

When you type a period (decimal point), the left-shifting action stops and the cursor moves to the right of the decimal point tab stop so that you can type more digits or characters. The result is that the digits or characters you type before the decimal point are right-aligned to the point (in the integer field), and the digits or characters you type after the decimal point are placed to the right of the decimal point (in the decimal field).

Decimal point tabbing only works when variable tabbing is on. Decimal point tab stops are marked with a **#** in the ruler line between the menus and the text.

The ruler line above your text shows you the current WordStar settings for left and right margins and tab stops. You can type *your own* ruler line of hyphens, exclamation points (**!**) for tab stops, and number signs (**#**) for decimal point tab stops, and use it to change the margin and tab settings:

```
L----!----!----!--------#----------#--R
```

Type the ↑**OF** command to clear margin and tab settings and reset them according to your ruler line. You can even keep your ruler line in your file and make it a non-printing line by starting it with two periods (**..L**).

Length of the Printed Page

By default, the printed page is 66 lines long. WordStar prints on 55 of them, leaving three lines at the top and eight lines at the bottom. Within the eight lines at the bottom, WordStar adds the page number, centered. The *paper length* parameter is 66 lines.

You can change the paper length parameter with the ***.PL n*** command (type a space between ***.PL*** and the number ***n***). For example, the SAMPLE.TXT file had the command **.pl 67** to change the paper length to 67 lines. The following command changes the length to 88 lines (for legal-size paper):

.PL 88↩ (

To design your printed pages, start with vertical page layout commands. The paper length you choose must match your paper (WordStar assumes 66 lines to an 11-inch page, or 6 lines per inch). You should change your paper length for legal-size paper longer than 11 inches, or for printers that print more or less than 6 lines per inch. Specify the total number of lines that can fit on a page.

WordStar places the body of your text on the page using the paper length minus the *top and bottom margins*. The top and bottom margins are controlled by the ***.MT n*** and ***.MB n*** commands. These commands set the number of lines between the text body and the top and bottom edges of the page.

Page Numbering

WordStar automatically numbers every page sequentially, unless you type the ***.OP*** command (omit page numbers). SAMPLE.TXT shows this command used at the very beginning of the file to omit page numbers for the entire file.

WordStar prints page numbers in the center of the bottom margin. To change the page number position, use the ***.PC n*** command (where ***n*** is the column number to print the page number). Use ***.PC n*** only when you are *not* using a footing or the ***.OP*** command to suppress page-numbering.

The ***.PN*** (page number) command will force WordStar to start counting pages using an initial page number. You use this command to keep track of page numbers in a document consisting of multiple files.

For example, if chapter one of your novel occupied one file, and chapter two occupied another file, you would want to print the files with page numbers starting at one in chapter one and continuing through chapter two. The file with chapter one would not be altered; however, the file with chapter two could start with a ***.PN*** command to start page numbering at the page number following the last page of chapter one.

The following example shows the ***.PN*** command changing the page number to page 16. Every page following this page is numbered consecutively from 16:

.PN 16↩ (

If another ***.PN*** command occurs, the page numbering changes again.

Page Breaks

Ordinarily, WordStar puts page breaks into the file automatically by calculating how many lines can fit on a page (given the parameters you may have changed).

You can control pagination with the ***.PA*** and ***.CP n*** commands. The ***.PA*** command forces the start of a new page at the line on which you place the command. For example, move the cursor to the first column in the line before the headline **SAMPLE TEXT** in the SAMPLE.TXT file. Type the following command, which causes a page break display line to appear:

.PA↩ (

This command causes the next line to be printed on the next page.

The ***.CP n*** command starts a new page if the next ***n*** lines won't fit on the current page. This command is called the *conditional page* command. A typical use of the conditional page command is to type ***.CP10*** above each section title, which forces a new page if the next 10 lines don't fit on the current page. Conditional paging is also used before tables and charts.

Headings and Footings

You can specify a heading by starting a line of text with the ***.HE*** command. Type the following line as a heading:

.HE This is a heading for the SAMPLE.TXT file↩ (

The entire line is used as a heading until you type another ***.HE*** command (the ".HE" is never printed). You can underline, use boldface, and use spaces to print the heading flush to the right margin.

You specify a footing in the same way with the ***.FO*** command. The default footing is simply the page number in the center of the page within the bottom margin (there is no default heading).

If you include the ***#*** symbol in the heading or footing (or both), WordStar will automatically substitute the page number for the symbol in each heading or footing. Try typing the following footing with a page number symbol:

.FO This footing has a page number Page #↩ (

This footing will print at the bottom of each page. The page number will print as **Page 1**, **Page 2**, etc.

Include the ↑***K*** control command, and WordStar will automatically print odd and even page numbers on different sides of the page in either the heading or footing (or both):

.FO Odd on right side, even on left Page #↑***K***↩ (

If you type heading and footing commands, WordStar places them within the top and bottom margins (outside the text body). You can also specify *where* you want these headings and footings to fall within these margins.

The heading margin (***.HM n*** command) sets the number of lines between the page heading and the top of the page. The footing margin (***.FM n*** command) sets the number of lines between the page footing and the bottom of the page.

LESSON THREE: The Print Operation

The no-file menu, or the ↑***K*** menu from edit mode, lets you print text files. From the no-file menu, type ***P*** to print any file. From edit mode (yes, while editing another file!), you can print any file except the one you are editing, by typing ↑***KP***.

After starting a print operation, you can interrupt or stop printing by typing another ***P*** from the no-file menu, or ↑***KP*** from edit mode. When you interrupt the printing, you have these choices:

- Resume printing where it left off (after you change ribbon, paper, or whatever).
- Put a hold on the printing operation while you perform other WordStar activities (however, you cannot edit the file you are printing).
- Cancel the print operation entirely (in order to edit the file you are printing, or whatever).

You should position the paper in your printer before starting a print operation (you may have to experiment with positions for best results).

Type ***P*** from the no-file menu (you could also type ↑***KP*** from edit mode, if you are editing a file other than SAMPLE.TXT). WordStar asks for a filename, and you can use the ↑***R*** command to repeat the name B:SAMPLE.TXT. Here's a summary of the command editing functions to help type filenames:

↑***R***	Restore the last entry (this will repeat the last filename you used for printing, or the filename you used for editing.
↑***S***	Erase character to the left.
↑***D***	Restore character by character, including those erased with ↑***S***.
↑***Y***	Erase the entry (a ↑***R*** will restore the entry).
↑***U***	Cancel the command (press the ESC key to return to the mode you were in when you typed the command).
↑***F***	Display the file directory for the "logged" drive.

After typing the name of the file to be printed, press RETURN to see the options you have (the ESC key will bypass the options). These options all have default values you can use by simply pressing RETURN for each question. However, one question, if answered with a ***Y*** for yes (not the default), will let you pause the print operation between each page, so that you can insert single sheets (such as letterhead).

Read each question's description before pressing RETURN for the default value:

DISK FILE OUTPUT (Y/N)? ↩ (No)

For normal printing, simply type RETURN (a "no" response). You can elect to send a copy of the "printed output" to a disk file rather than a printer (useful if you have no printer at the moment).

START AT PAGE NUMBER (RETURN for beginning)? ↩

Press RETURN to start at page one, or type the number of the first page to be printed. This allows you to re-start the printer after a paper jam, or to print only the latter portion of a document.

STOP AFTER PAGE NUMBER (RETURN for end)? ↩

Press RETURN to print the entire file, or type the number of the last page to be printed (to print a portion of a file).

USE FORM FEEDS (Y/N)? ↩ (No)

Answer ***Y*** for yes if your printer can respond properly to the "form feed" character and advance the page to the top of the next page. Form feeds are quicker than line feeds (with some printers), and they eliminate the need to set the paper length to exactly match the paper.

Answer with a RETURN (for a "no" response) for most daisy-wheel printers. Normally, WordStar sends the correct number of line feeds to advance the paper properly.

SUPPRESS PAGE FORMATTING(Y/N)? ↩ (No)

Press RETURN for normal print operations (a "no" response). You can type ***Y*** to get a printout of the file with the print control commands and dot commands printed as text (to proofread them, or to suppress the controls for whatever reason). The print control and dot commands are not interpreted by the printer.

PAUSE FOR PAPER CHANGE BETWEEN PAGES(Y/N)? ↩ (No)

If you lack a tractor-feed mechanism on your printer, or if you want to print on individually-loaded single sheets of paper (letterhead or special paper), answer ***Y*** for "yes" to make the printer pause between pages. WordStar displays a **PRINT PAUSED** message in the status line. To continue printing, type a ***P*** from the no-file menu, or ↑***KP*** from edit mode.

Press RETURN (for a "no" response) if you are printing on continuous form paper using a tractor-feed mechanism (most dot-matrix printers have built-in tractor-feed mechanisms).

Ready printer, press RETURN: ↩

Make sure your printer is turned on, the paper loaded and positioned, and the "on-line" switch is on (or whatever else your printer requires), before you press RETURN.

NOTE

If you choose all the defaults for your answers, including "no" for the pause between pages, you might as well skip all of these questions by pressing the ESC key instead of RETURN after typing the filename. Note, however, that the message **Ready printer, press RETURN** will *not* appear, and that your printer must be ready when you press the ESC key.

Interrupting or Canceling Printing

If you type ***P*** from the no-file menu, or type the ↑***KP*** command from within edit mode, while the printer is printing, WordStar will stop the printing and display the following message:

```
TYPE "Y" TO ABANDON PRINT, "N" TO RESUME,
↑U TO HOLD:
```

Pick the appropriate choice:

Y	Cancel the print operation altogether.
N	Make the necessary printer adjustments, and type ***N*** to continue printing where it left off.
↑***U***	Put a hold on the printing, to perform editing operations or other WordStar operations. Resume printing where you left off by typing ***P*** from the no-file menu or ↑***KP*** from edit mode.

End of Lesson

You've managed to get through editing a file, typing text, inserting and deleting text, indenting and re-forming paragraphs, and changing margins and tabs. You also learned a few special effects for printing, some printing controls and the questions to answer before printing text files.

What comes next? The next issue will include lessons on moving blocks of text within a document, transferring sections of one document to another, "boilerplating" paragraphs and sections of a document, finding and substituting characters, words, and phrases, printing multiple documents in succession with accurate page numbers, quick keystrokes for typical operations, more on dot commands, and a tutorial on using MailMerge.

Remember those decimal tabs? WordStar versions above 3.0 give you a "column mode" that lets you move a column without disturbing the other columns. All this and more in next issue's WordStar lessons. Don't miss it!

Glossary...

Word Processing Terminology

Some of the jargon used in this issue

This glossary has some of the terminology used by CP/M computerists who use word processing programs such as WordStar. Advanced terms will be covered in future issues that contain articles on advanced word processing activities.

ASCII: As in *text editors and word processors store data using the ASCII character set.* ASCII stands for American Standard Code for Information Interchange — a popular code used by minicomputers and microcomputers. Characters (letters, numbers and symbols) are assigned numeric codes, so that different computers can understand each other (not so that we can understand computers).

".BAK" file: As in *never edit a ".BAK" file, always rename it to have a filename extension other than ".BAK."* Many word processing programs automatically create "backup" files, with the ".BAK" filename extension, to hold the previous version of the document you are editing. This feature is included to help you protect important documents from accidental modifications or deletions.

baud: As in *we're transferring data at the rate of 300 baud.* Baud refers to the number of bits of data transmitted per second. For example, 300 baud is approximately 30 characters (letters, digits, symbols, etc.) per second. If you have trouble with bad phone lines while transferring data at 300 baud, you might be able to successfully transfer the data at a slower baud rate, such as 110 baud. Computers can transmit data to printers at different speeds (usually 300 baud or 1200 baud).

bit: As in *CP/M ".COM" files store codes in all eight bits of each byte, whereas ASCII text files store codes in only seven of the eight bits.* A bit is the smallest unit in the binary system used to code data.

block: As in *WordStar lets you move a block of text to another place in your document.* In word processing, a block is a marked section of text that is ready to be copied to another file, or moved to another place within the file.

However, block is also a technical term for describing how CP/M manages all types of files (not a word processing term). For CP/M files, a block of data consists of 128K bytes (128 x 1024 bytes). In this meaning, a block is a group of characters that are transmitted (moved) or stored together.

boilerplate: In legal documents, a boilerplate paragraph is one that is used often in many different documents and simply copied into them. With word processors, any paragraph or section of text can be copied into any other document, by "reading a file" into your document. A user can keep copies of boilerplate sections on disk for inclusion in documents.

Continued on page 65

An Impatient User's Guide...

WordStar Writing and Editing Summary

by Tony Bove & Cheryl Rhodes

Excerpted from a forthcoming pocket reference guide on WordStar (reprinted with permission from Addison-Wesley Publishing Co.).

Creating a Document

WordStar starts by displaying its no-file menu.

WordStar is set up in two ways: for typical word processing or for typical program writing and editing. WordStar has *default settings* for these two *modes* so that users can work right away, without defining margins, tabs, etc.

The modes are selected from the no-file menu (WordStar's first menu). Select ***D*** (document mode) for standard documents, or select ***N*** (non-document mode) for writing the source code of programs.

Document Mode

Document mode (***D***) assumes you want to indent paragraphs with five spaces (using your TAB key), and use WordStar's ability to "wraparound" sentences as you type them (in order to justify or fill lines to the right margin). In this mode, use your RETURN key only to end paragraphs and unjustified or unfilled lines.

If you don't like all of the document mode settings, you can change any of them by typing the prefix ***↑O*** to display the *on-screen* menu, and the letter for the particular setting. For example, ***↑OJ*** will turn the justification setting to *off*. Another ***↑OJ*** will turn it back on.

Document Mode Settings:

LEFT MARGIN	Column 1
RIGHT MARGIN	Column 65 (80-column screen) or Column 60 (64-column screen)
VARIABLE TAB STOPS	Col. 6, 11, 16, etc.
VARIABLE TABBING	ON
WORD WRAP	ON
JUSTIFICATION	ON
HYPHEN-HELP	ON
RULER DISPLAY	ON
PAGE BREAK DISPLAY	ON
PRINT CONTROL DISPLAY	ON
SOFT HYPHEN ENTRY	OFF
LINES PER PRINTED PAGE	55

For default settings used in printing, see Chapter 4.

Non-Document Mode

Non-document mode uses default settings suitable for writing and editing programs.

Non-document mode assumes you want to indent with an eight-space tab (used in programming), and use the RETURN key to end each line ("wraparound" of lines does not occur automatically as you type them). Non-document mode also assumes you do not want a display of page breaks or a page and line count display — simply a line count.

The eight-space tab is actually the ***↑I*** character, not eight spaces, and you use either the TAB key or ***↑I*** to type it. All instances of the RETURN key are normal ("hard") RETURN keys.

Some users do not like non-document default settings and use document mode, with a few changes described below to keep compatibility with non-document files. Compatibility with other text editors is assured in non-document mode.

Non-document Mode Settings:

Non-document mode uses the above settings for document mode with the following changes:

FIXED TAB STOPS	Col. 9, 17, 25, etc.
VARIABLE TABBING	OFF
WORD WRAP	OFF
JUSTIFICATION	OFF
HYPHEN-HELP	OFF
RULER DISPLAY	OFF
PAGE BREAK DISPLAY	Inoperative

To change any of these settings, use the ***↑O*** prefix to display the on-screen menu, and choose the letter for the setting you wish to change.

For default settings used in printing, see Chapter 4.

File Compatibility

WordStar's text files can be transferred to any other CP/M system and be edited by most other CP/M word processing programs. However, there may be incompatibilities (differences) that prevent your using the files with other word processing programs or data communications programs.

Document mode files may contain "soft" spaces, carriage returns, and hyphens, whose *parity bit* (bit 7, or the "high-order bit" of each byte, or character) is used by WordStar (set to one). These "soft" characters are inserted or deleted by WordStar whenever you re-form paragraphs. Non-document files contain no "soft" characters.

To turn a document mode file into a non-document mode file that is compatible with other text editing programs, simply choose the ***N*** option from the no-file menu to edit the file as a non-document file. Another way to strip away "soft" characters is to use the CP/M PIP command with the ***[Z]*** option, to set each character's parity bit to zero (see an example in Chapter 1 under "Copying Files").

If you plan to use document mode for files that will eventually be non-document files, turn off the following settings for compatibility (to avoid turning extra "soft" spaces or hyphens into "hard" spaces and hyphens):

1. Turn off JUSTIFICATION (**↑OJ**) for ragged right text. Type with justification off, or re-form paragraphs (**↑B**) with justification off. This will prevent extra "soft" spaces between words.
2. Turn off HYPHEN HELP (**↑OH**) to be sure you don't add "soft" hyphens to hyphenate words at the end of lines.
3. Do not use print controls (**↑P** menu) unless you intend to change them to other controls or print the file with WordStar.

Writing and Editing

To write a document, select **D** from the no-file menu, type the filename (followed by RETURN), and after WordStar displays the main menu and ruler line, you can type words, sentences and paragraphs. Use your RETURN key only to end paragraphs.

To edit an existing document, select **D** from the no- file menu, type the filename (followed by RETURN), and after WordStar displays the main menu and ruler line, you can move the cursor over words, up and down lines, or up and down screen "pages" of text. You can also *scroll* lines up or down without moving the cursor (to improve readability).

To write or edit a non-document file, select **N** from the no-file menu, and type the filename (followed by RETURN). Use your RETURN key to end lines. Selecting **N** automatically changes an existing document file into a non-document file.

Inserting and Entering Text

RETURN key ↩	END A PARAGRAPH: use to end a paragraph or "hard" line in document mode; or end each line in non-document mode. WordStar displays RETURN as an angle bracket (‹) in the far right column of your screen.
↑B	RE-FORM PARAGRAPH: re-form paragraphs to fit new margin settings, or re-form paragraphs after editing changes or after turning justification on or off, or re-form to override hyphen help.
↑V	INSERT ON/OFF: turn insert mode on or off (when off, you type over existing text).
↑N	INSERT BLANK LINE: insert a "hard" RETURN (without moving the cursor).
TAB key or **↑I**	TAB SPACE: insert a tab space if insert mode is on; otherwise, move cursor a tab space.
↑OC	CENTER A LINE: cause a line to be centered between the left and right margin. End the line with a RETURN, then return the cursor to the line (use **↑E**), before using **↑OC** to center the line.
↑Pc	INSERT CONTROL CHARACTER: insert a control character **c**.

Deleting Text

DEL	DELETE or RUBOUT key: backspace and erase one character.
↑QDEL	DELETE TO BEGINNING OF LINE: **↑Q** with the DEL (or RUBOUT) key erases backwards to the beginning of the line.
↑G	DELETE CHARACTER: delete character at the cursor position.
↑T	DELETE WORD: delete one word to the right of the cursor (to the next space).
↑Y	DELETE LINE: delete entire line cursor is on.
↑QY	DELETE TO END OF LINE: delete to the end of the line from the cursor (line left of cursor remains).
↑KY	DELETE BLOCK: delete a marked block.

Moving the Cursor

↑E	LINE UP: move the cursor up one line (towards beginning of document).
↑X	LINE DOWN: move the cursor down one line (towards end of document.
↑A	WORD LEFT: move the cursor to the left (backwards) one word.
↑F	WORD RIGHT: move the cursor to the right (forwards) one word.
↑S	CHARACTER LEFT: move the cursor to the left one character.
↑D	CHARACTER RIGHT: move the cursor to the right one character.
↑QS	BEGINNING OF LINE: move cursor quickly to the beginning of the line.
↑QD	END OF LINE: move cursor quickly to the end of the line.
↑QC	END OF FILE: move cursor quickly to the end of the file.
↑QR	BEGINNING OF FILE: move cursor quickly to the beginning of the file.
↑QE	TOP OF SCREEN: move cursor quickly to the top of the screen.
↑QX	BOTTOM OF SCREEN: move cursor quickly to the bottom of the screen.
↑C	SCREEN FORWARD: move the cursor to the next screen of text in the file.
↑R	SCREEN BACKWARD: move the cursor to the previous screen of text in the file.

Scrolling and Reading Text

↑Z	SCROLL UP: move screen up one line, without moving the cursor.
↑W	SCROLL DOWN: move screen down one line, without moving the cursor.
↑QZ	CONTINUOUS SCROLL UP: scroll screen one line at a time, continuously until you press a key.
↑QW	CONTINUOUS SCROLL DOWN: scroll screen one line at a time, continuously until you press a key.
↑C	SCREEN FORWARD: move the cursor to the next screen of text in the file.
↑R	SCREEN BACKWARD: move the cursor to the previous screen of text in the file.
↑QQ	REPEAT A COMMAND: repeat any command, such as **↑C** to move one screen forward, indefinitely, without re-typing the command. You can vary the speed of repetition by typing a number from one to nine (nine is slowest). For example, type **↑QQ↑C** and **9** (or less) to read one screen

at a time at your reading speed.

Moving Cursor to Place Marker or Block

↑QB	MOVE TO BEGINNING OF BLOCK: move cursor to the beginning of a marked block.
↑QK	MOVE TO END OF BLOCK: move cursor to the end of a marked block.
↑Qn	MOVE TO PLACE MARKER ***n***: move cursor quickly to a set place marker ***n*** (***n*** is from 0 to 9).
↑Kn	SET PLACE MARKER ***n***: set a place marker ***n***, where ***n*** is from 0 to 9. Place markers stay in place through a **↑KS** (save and resume) command; otherwise, they are in place only during the edit session and are not stored in the file.
↑QP	RESUME POSITION AFTER SAVE: move cursor to the position it was in before you used **↑KS** to save the file.
↑QV	MOVE TO LAST FIND OR BLOCK: move cursor to the position before the last find or replace (**↑QF**, **↑QA** or **↑QL**), or to the source of the last block moved, copied or deleted.

Saving or Abandoning a Document

When you create a file with WordStar, the file is not stored on disk until you save the edit session with one of the following save commands.

When you select an existing file to edit, your edits are not incorporated in the stored file until you save the edit session with one of the following save commands.

If you do not want to save the newly created file, or not save the changes you just made to an existing file in edit mode, you can *abandon* the edit session with the abandon command below. These commands are shown in the Block and File menu, displayed with the **↑K** command prefix.

Save the Edit Session

↑KS	SAVE AND RESUME: save the file and re-edit the file; a **↑QP** returns cursor to the position before the save.
↑KD	SAVE AND END: save the file and go back to the no-file menu to select another file, another mode, another option, or to perform file operations. If you want to re-start WordStar with its initial default settings, use **↑KX** instead.
↑KX	SAVE AND EXIT: save the file and leave WordStar (return to CP/M command line). Use this command to save your document and re-start WordStar with its initial default settings.

Abandon the Edit Session

↑KQ	ABANDON EDIT SESSION: abandon all changes during this edit session (file remains untouched). If you were creating a file during the edit session, the file is abandoned and not stored on disk.

On-screen Settings

The On-screen Menu (use the **↑O** prefix) shows the display settings for your document (margins, tabs, justification, page breaks, etc.) WordStar is designed to print pages that conform exactly to your display settings. Lines comprised of dashes and ending with **P** at far right screen position show breaks between printed pages. One printed page is nearly three screenfuls of text, at regular margins.

The regular settings for margins, tabs, line spacing, and other features are called *default settings*. These are the settings for WordStar in document mode (regular WordStar, not customized), before making any changes.

Margins and Tabs

↑OL	SET LEFT MARGIN: set the left margin column position by specifying a column number, or by pressing ESC to use the current cursor column. **Default setting:** column 1.
↑OR	SET RIGHT MARGIN: set the right margin column position by specifying a column number, or by pressing ESC to use the current cursor column. **Default setting:** column 65 (80- column screen) or column 60 (64-column screen).
↑OF	SET MARGINS/TABS FROM LINE: set the right and left margin column positions by typing a "ruler" line. A "ruler" line consists of "hard" hyphens with **!** symbols standing for regular tabs and **#** symbols for decimal tabs, with the first non-space character setting the left margin column, and the last non-space character setting the right margin column.
↑OX	RELEASE MARGIN WHILE TYPING: release the margin control on wrap-around until the cursor returns to an area within the margins, or until another **↑OX** command.
↑OI	SET VARIABLE TAB: set variable tab stop at column you specify, or at the current cursor column if you press the ESC key. For a decimal tab, type a **#** character before specifying a column number or pressing the ESC key.
↑ON	CLEAR VARIABLE TAB: clear variable tab stop at column you specify, or at the current cursor column if you press the ESC key.
↑OV	VARIABLE TAB ON/OFF: turn on or off variable tabs (default is ON). If off, tabs are fixed (and stored as **↑I**); otherwise tabs can be set or reset, and they consist of "soft" spaces.
↑OG	PARAGRAPH INDENT: temporarily indent the left margin one variable or fixed tab space, until you type a RETURN (or move the cursor to the left of the indented tab stop). For each successive **↑OG**, the paragraph is indented one tab space; therefore, three **↑OG** commands indent the paragraph 3 tab spaces.
↑B	RE-FORM PARAGRAPH: re-form a paragraph after changing the margins, tabs, or turning on a paragraph indent. Re-forming starts at the cursor and ends at the next RETURN. If you use **↑B** after turning on a paragraph indent (with **↑OG**), the paragraph indent is turned off after the paragraph is re-formed.

Line Functions

↑OS	SET LINE SPACING: set line spacing to double-spaced, triple-spaced, etc. Type ***2*** for double, ***3*** for triple, etc. **Default setting:** 1.
↑N	INSERT BLANK LINE: insert a "hard" RETURN (at current cursor position, without moving the cursor).
↑OC	CENTER A LINE: cause a line to be centered between the left and right margin. End the line with a RETURN, and return the cursor to the line (**↑E**), before using **↑OC** to center the line.

Toggles

"Toggles" are features that are either ON or OFF. When a toggle is ON, you turn it off by typing the command; when OFF, you turn it on by typing the command. WordStar displays **(ON)** if the feature is on, or **(OFF)** when the feature is off.

↑OJ	JUSTIFICATION ON/OFF: turn off or on right-margin justification. When on, lines are flush to the right margin; when off, lines are filled ragged-right unless you also turn off word-wrap. If your printer has micro-space justification capabilities, WordStar will control the spaces between letters for justificaion or line fill. Otherwise, justification mode uses "soft" spaces between words to justify lines. **Default setting:** ON.
↑OW	WORD WRAP ON/OFF: turn off or on line "wrapar-

	ound" that occurs while you type. If you turn off line "wraparound," you must end each line by typing a RETURN. Justification or line fill will not work with wordwrap off. **Default setting:** ON.
↑***OT***	RULER LINE ON/OFF: turn off or on the ruler line display of margins and tabs. **Default setting:** ON.
↑***OD***	PRINT CONTROLS DISPLAY ON/OFF: turn off or on the display of print control characters. Always turn ON before editing if the display is turned off. You can turn off the display of print controls for viewing text as it will look without print control characters. Print control characters are inserted using the ↑***P*** prefix. **Default setting:** ON.
↑***OP***	PAGE BREAK DISPLAY ON/OFF: turn off or on the display of printed page breaks. A page holds 55 lines (unless you use imbedded dot commands to control printing). **Default setting:** ON.
↑***OE***	SOFT HYPHENS ON/OFF: turn on or off entering "soft" hyphens rather than "hard" hyphens. A "soft" hyphen is one that will appear (or print) only if word wrap or paragraph re-forming places it at the end of a line. For regular hyphens and dashes, leave off. **Default setting:** OFF.
↑***OH***	HYPHEN HELP ON/OFF: turn off or on the hyphen help feature that occurs during paragraph re-forming with ↑***B***. The hyphen help feature positions the cursor at the letter to appear *after* a hyphen, if you so wish. You can type a hyphen to enter a "soft" hyphen (whether the "soft hyphens" feature is on or off), or move the cursor to a better position and type a hyphen, or continue re-forming without hyphens with another ↑***B*** command. If off, hyphen help does not occur. **Default setting:** ON.

Finding and Replacing Text

The ↑***QF*** find command and the ↑***QA*** find-and-replace command have options you can use that affect the operations (shown after the commands). If you type either command by mistake while looking for another ↑***Q*** command, or if you make mistakes while typing the text to find or replace, use the ↑***U*** command to interrupt the command, and then press your ESC key.

↑***QF***	FIND TEXT: find a group of characters (can include spaces, punctuation marks, etc.). The options below are available, as well as special characters to use in place of text or characters.
↑***QA***	FIND AND REPLACE TEXT: find a group of characters and replace with another group. The options below are available, as well as special characters to use in place of text or characters.
↑***L***	FIND OR REPLACE AGAIN: repeat the last ↑***QF*** or ↑***QA*** command exactly as typed, including any options selected.
↑***QV***	MOVE TO LAST FIND OR REPLACE: move the cursor to the position after the last find or replace.

Options

You can bypass the **OPTIONS?** question by pressing RETURN when you see it, or by pressing your ESC key after typing the text to find (while using ↑***QF***), or by pressing ESC after typing the text to replace the found text (while using ↑***QA***).

n	Perform the find or replace operation ***n*** times.
B	Search backwards in the file (use with ***G*** to search from the end to the beginning).
U	Ignore the distinction between UPPER and lower case characters ("Word" will match with "WORD" or "word").
G	Search (and also replace, if used with ↑***QA***) globally from beginning to end (or end to beginning, if used with ***B***).
W	Find the group of characters as a whole word, with no letter or digit before or after it.

Special Characters

When typing text to be found, or text to be used as replacement, you can use the following special characters in place of regular textual characters or punctuation symbols:

↑***A***	Match any single character (to enter ↑**A** in your group of text, type ↑***P***, then ↑***A***).
↑***N***	Match a RETURN (carriage return/line feed combination) character (to enter a ↑**N**, type ↑***N***).
↑***Ox***	Match any character other than **x** (type ↑***O*** followed by a character ***x***).
↑***S***	Match any special character (to enter ↑**S** in your group of text, type ↑***P***, then ↑***S***).

These options and special characters apply for finding and replacing text. In addition, the following options are useful for replacing text:

N	Replace automatically, without asking yes or no (↑***QA*** will ask for a ***Y*** (yes) or ***N*** (no) response before replacing, if you don't use this option).

Interrupting or Repeating Commands

To interrupt any command while it is asking a question, type ↑***U*** and press your ESC key. To repeat a command's execution, first type ↑***QQ***, then type the command. For example, to scroll quickly through pages of text, you can repeat the ↑***C*** command over and over by typing ↑***QQ***↑***C*** The repeat function lets you control the speed of execution: you pick a number between 1 (fast) and 9 (slow).

To stop a repeating command, or "back out" of a menu (not choose any selection), type a space (press your space bar).

Interrupting Commands

↑***U***	INTERRUPT A COMMAND: use to interrupt a command during its execution, or to "back out" of a command's request.
ESC key	Use after typing ↑***U*** to interrupt a command. The ESC (EScape) key is also used in place of RETURN to skip past options (in ↑***QF*** and ↑***QA*** commands, and in the print operation).
Space Bar	Use to stop repeating commands (commands typed after typing ↑***QQ***), or to "back out" of a menu without selecting an option (return to previous mode of operation).

Repeating Commands

↑***QQ***	REPEAT A COMMAND: type ↑***QQ*** before typing any other WordStar command (such as ↑***C*** to scroll text, or ↑***QF*** to find text). You can vary the speed of the repeating command by typing a number between one and nine (one is fast, nine is very slow). If you use ↑***QQ*** with ↑***C*** to scroll through pages of a document, pick the speed that matches your reading speed. You can stop any repeating command by typing a space.

Block Operations

Block operations let you define a section of text (letter, word, phrase, sentence, paragraph or group of paragraphs) as a *block* that can be moved or copied to another location in the document (for "cut and paste" manipulation of text) or to another document (using the *block write* command). To use block operations, you must first define the block of text by *marking the beginning and the ending* of the block. You can mark only one block at a time. By marking a new block, you automatically unmark the previous block.

Marking or Unmarking a Block

↑**KB**	MARK BEGINNING: mark the beginning of a block.
↑**KK**	MARK END: mark the end of a block.
↑**KH**	HIDE BLOCK: unmark a block temporarily, or make it reappear marked (while hidden, a block cannot be moved, copied, deleted, written to a file, or found by any block command, except ↑**KH**.

Move, Copy, or Delete a Block

↑**KV**	MOVE BLOCK: move a block by inserting a copy of it at the cursor position, and deleting original block.
↑**KC**	COPY BLOCK: copy a block by inserting a copy of it at the cursor position, leaving the original block untouched.
↑**KY**	DELETE BLOCK: delete a block.

Transfer a Block To Another File

↑**KW**	WRITE BLOCK: write a copy of a block to another file.

Cursor Movement To a Block

↑**QB**	MOVE TO BLOCK BEGINNING: move the cursor to the beginning of a block quickly.
↑**QK**	MOVE TO BLOCK END: move the cursor to the end of a block quickly.
↑**QV**	MOVE TO BLOCK SOURCE: move the cursor to the place from which the last block was moved, copied, or deleted.

Column Mode Block Operations

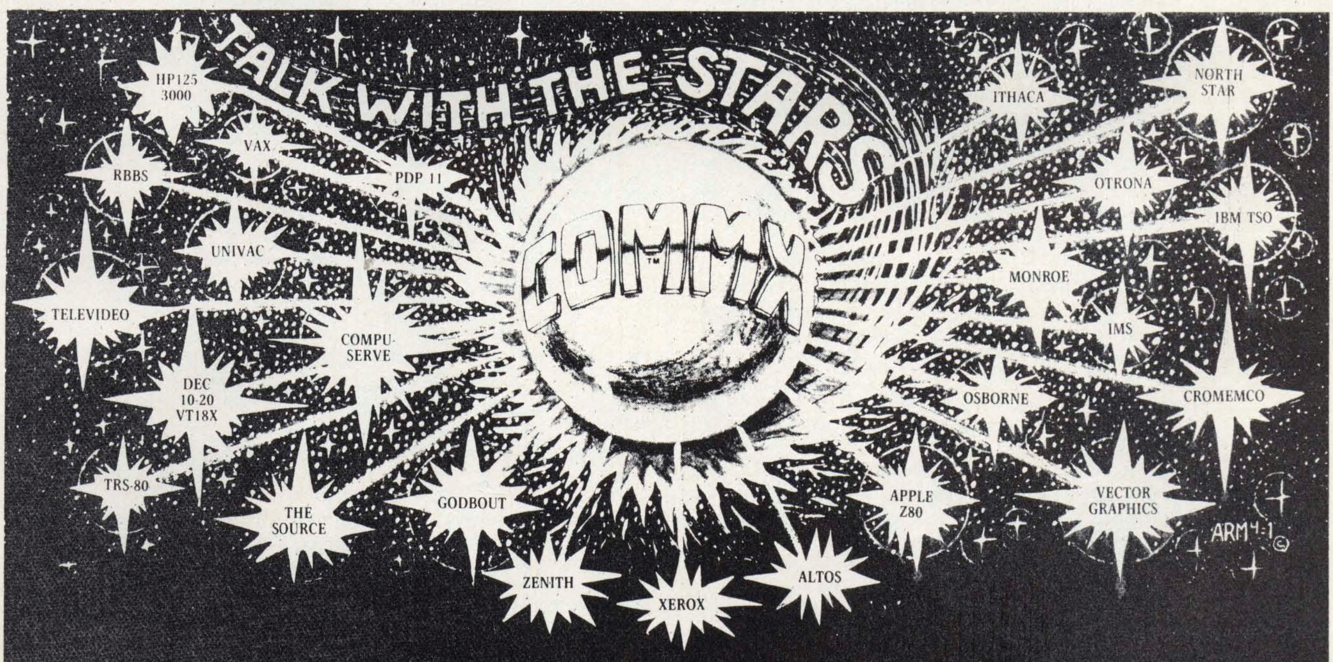
If you have a table of information presented in rows and columns, WordStar treats horizontal lines ending with RETURN (Carriage Return, CR, or ENTER) as *rows*, and vertical text spanning these rows as *columns*.

In normal mode (not column mode), you can mark an entire row or part of a row as a block, and then move or copy it within the document, or delete it, or write it to another document (another file). However, you cannot mark a column as a block without marking the other columns as well, *unless you turn on column mode*.

In column mode, you can mark a column without including other columns or text on the same rows. You can also copy or move a column to another location in the document, without moving or copying other columns, because WordStar disregards RETURNs (Carriage Returns or ENTERs that are at the end of paragraphs and lines). However, you must create space at the other location for the moved or copied column; otherwise, the moved or copied column will be inserted without RETURNs, causing any other text at that location to be displaced. Create space at that location by inserting RETURNs for blank lines.

After using column mode, be sure to *turn it off* by typing ↑**KN**

↑**KN**	COLUMN MODE ON/OFF: turn on or off *column mode*. When column mode is on, you can mark a column of text as a block, not including other text in other columns on the same lines. Block commands such as *block move, block copy* and *block write* affect only the marked columns, leaving other text in other columns on the same lines intact.
↑**N**	INSERT BLANK LINE: insert a "hard" RETURN without moving the cursor. This creates one blank line; for more lines, simply repeat the command. Insert blank lines in order to make room for a moved or copied column block (there is no need to make room for moved or copied blocks in normal mode).



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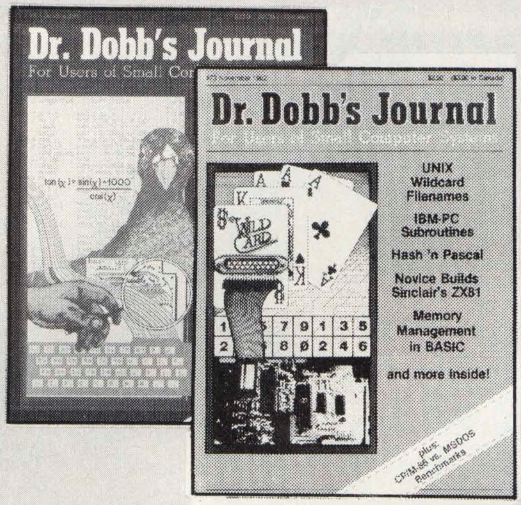

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Installing WordStar

For Displays, Printers, and Default Edit Settings

In this article we use the ↑ (uparrow) symbol to stand for the Control key on your keyboard (sometimes labeled CTRL, CNTL or ALT), and we use the ↵ symbol to stand for the RETURN key (sometimes labeled CR, RET or ENTER). We use ***THIS FACE*** to show what you should type, and **THIS FACE** to show what appears on your system display.

Although WordStar may be supplied with your computer in an already installed form for your computer's display, you usually have to re-install WordStar for your type of printer. WordStar supports most daisy-wheel and dot matrix printers, and will even print with most line printers.

In addition to installing WordStar for your printer, you may want to install a version of WordStar with certain *default settings* that fit your writing and editing habits. For example, WordStar can be installed to always start in non-justified mode rather than justified mode, or to always start with help messages suppressed.

This guide is meant to be supplementary to the installation chapters in your WordStar manual, or to specific instructions provided with your version of WordStar. Advanced customizations will be covered in a future article, after we've had a chance to fully test the popular customizations.

System Requirements

WordStar is supplied for CP/M and "CP/M-like" microcomputer systems.

WordStar needs to run in a hardware environment that includes an 8080, 8085, Z80, 8086 or 8088 processor, and at least 45K of internal RAM ("read-and-write" memory), though 64K or more is recommended for usual word processing activities.

If your computer does not include a video display and keyboard, you can use almost any ASCII VDT terminal (with keyboard) that can provide a display of at least 16 rows with 40 columns. (ASCII is the American Standard Code for Information Interchange, and a VDT is a video display terminal.)

WordStar may be already installed for your computer; nevertheless, the INSTALL.COM program is provided for you to install or re-install WordStar.

The INSTALL terminal menu should include your terminal or computer, and if you select the appropriate menu option, WordStar installs itself automatically. If your terminal or computer is not in the INSTALL menu, you may have to follow special installation instructions found in your WordStar manual. The display terminal *must* be able to directly position its cursor using values for row (line) and column (space).

You can use WordStar with nearly any printer, but you may have to follow special installation procedures to use the special effects. If the INSTALL program shows your printer in its menu, you can select the menu option, and WordStar installs itself automatically for your printer.

Setting Up Your Disks

The WordStar package includes a floppy disk and a binder containing manuals (it might also include a training manual). You should have a CP/M system with at least two disk drives. Single drive systems are not as useful, and they require more elaborate instructions.

The following files should be included on the supplied disk:

WSU.COM

The un-installed version of WordStar; use it with INSTALL.COM to produce the installed version. Keep a backup copy of this program in a safe place, in case you need to re-install WordStar (for a new printer, etc.).

WSMSGS.OVR
An overlay file for WordStar that holds the help messages. You need to have this file on the same disk as the installed WordStar program.

WSOVLY1.OVR
Another overlay file for WordStar which must be on the same disk as the installed WordStar program.

INSTALL.COM
Installation program. After using it, you don't need to keep it on your working WordStar program disk, but you should keep backup copies of both the un-installed WordStar program (WSU.COM) and this installation program.

Use the PIP command to copy the WordStar files from the supplied disk to your system disk. The typical disk setup for WordStar operation is:

- A system disk in drive A holding the installed WordStar program and its overlay files, as well as CP/M commands and programs.
- A text file disk in drive B to hold your documents and other text files. You can store text files on your system disk, but should store at least one copy on another disk.
- If you have a hard disk system, use whatever drive you want. Most hard disk systems reserve user area 0 on each drive as a "system disk" for each user, and other user areas are available for text files.

Once formatted, the disk can hold any files. Typical users place copies of PIP.COM and STAT.COM (commands supplied with CP/M) on the text file disk as well as on the system disk.

Setting Up Your Printer

Some printers have option switches on an external control panel or inside the printer on a circuit board.

Typical switches are the following:

- AUTO LF or LOCAL LF must be **off**. If on, this switch makes the printer perform a "line feed" whenever it receives a carriage return, and therefore puts an extra line space between every line.
- AUTO CR should also be **off**. This switch causes the printer to overlap long lines to the next line.
- BAUD RATE, the speed at which characters are sent to the printer, must match the rate used by the computer port connected via cable to your printer. The baud rate is usually 300 (30 characters per second) or 1200 (120 characters per second).
- PARITY must be set to "ignore parity" ("M" position on some printers).
- PROTOCOL must be set with serial daisy-wheel and other printers interfaced at 1200 baud. WordStar supports the XON/XOFF and ETX/ACK protocols.
- FORM LENGTH should be set to match the paper you are using, especially if you say "yes" (type ***Y***) to the **USE FORM FEEDS** question during WordStar's print or merge-print operations.
- SET TOF (top of form) should be pressed after you position the paper at the top of the page, especially if you are using the form feed option in print or merge-print operations.

Running INSTALL

With the supplied WordStar disk in drive B, copy the WordStar files from drive B to drive A:

```
A⟩PIP A:=B:WS*.* ⮐
COPYING -
WSU.COM
WSMSGS.OVR
WSOVLY1.OVR
A⟩PIP A:=B:INSTALL.COM ⮐
```

Run the INSTALL.COM program by typing:

```
A⟩INSTALL⮐
```

The program will ask you if you want a first-time installation, and you should answer ***Y*** for yes. The first-time installation will install WordStar as WS.COM on the current drive (drive A if you typed ***INSTALL*** from drive A), and immediately run WordStar. INSTALL tells you that this will happen, and asks again if this is what you want. Type ***Y*** for yes.

If you wish to use a name other than WS.COM, or if you do not want to run WordStar yet, you can select other options by typing ***N*** to either question.

For example, if you want to create another version of WordStar that is installed for a alternate printer or terminal, type ***N*** for no to this question, and INSTALL displays the choices you have:

A Same as typing ***Y*** above: install WordStar as WS.COM on the current drive (drive A in the above example), and start running WordStar immediately.

B This option lets you install the un-installed version (WSU.COM), or re-install an already-installed version (WS.COM), and use any name (such as STAR.COM) for the new version as well as any drive. Also, this option installs WordStar without running it (useful if you are using a different terminal to install the program, and you don't want to run the new version on your terminal).

C This option is similar to option ***B*** *except* that this option will immediately run WordStar.

D This option lets you re-install any already-installed version of WordStar, and the new version *replaces* the old one (using the same name). The new version is run immediately.

Option ***B*** gives you the most flexibility. You can pick any version to install, and pick any name and drive for the new version, and also *not run* the new version so that you can perform CP/M operations after installing WordStar.

First time users: use the ***A*** option, or simply type ***Y*** (yes) for a normal first-time installation.

Display Terminal

INSTALL starts with a menu of terminal selections. If your terminal is displayed, select its letter. If not, select the additional terminal menus (***2*** and ***3***). If you can't find your terminal listed, ask your dealer if your terminal *emulates* a standard terminal that is listed.

If you can make no selection for your terminal, choose ***Z*** for none of the above, and refer to the section on custom terminal installations in your WordStar manual.

The program will verify your selection by asking if your selection is **OK (Y/N):**, and you should type a ***Y*** for yes or an ***N*** for no. If you answer no, the program will ask again for a terminal selection. If you answer yes, the program will continue with a printer menu.

Printer

If your printer is listed in the menu, type the appropriate letter for it. If you don't see your printer, or if you don't have a printer at this time (or if you just want to install a plain "vanilla" WordStar to use for now), select ***A*** for a "teletype-like" printer.

The following are typical printer selections:

- An "OEM Printer with MicroPro's I/O Master Interface" — this is usually the easiest choice; however, you must have the MicroPro I/O Master Interface installed by your dealer. With this selection, you are finished installing WordStar for your printer.

- A "teletype-like" printer as the CP/M LST: device (see the STAT utility in the CP/M tutorial in this issue). This is the simplest choice during the installation procedure, since it works with most printers. However, your CP/M system must already know how to print with this printer, and you will not have all the special printing effects as with daisy-wheel printers supported by WordStar.

- A daisy-wheel printer running at 1200 baud using the ETX/ACK or XON/XOFF protocols. You must have information about your printer-computer interface to make this selection. With no information, you may be able to select such a printer with no protocol to run at 300 baud, but printing will be slow.

To check to see if you can print from CP/M, type Control-***P*** to "echo" everything you type to the printer. If this does not work, check your printer cable connections, and check the manuals for both your system and your printer to see if they are switched to the same baud rate.

Communications Protocols

By answering ***Y*** to the next **OK (Y/N):** question, you move on to the next menu of "communications protocols." If you selected ***A*** for a "teletype-like" printer, choose ***N*** for "none required."

In order to print faster than 300 baud (30 characters a second), a communications protocol must be used between the computer and the printer. Some CP/M systems provide protocols and some do not. WordStar provides two protocols for use with systems that do not supply their own.

WordStar provides two types of protocol handlers: ETX /ACK and XON/XOFF. Both require your computer to be able to receive characters from the printer as well as send characters.

If CP/M provides the ETX/ACK protocol, you should *not* use WordStar's ETX/ACK protocol. If CP/M provides XON/XOFF, you can also select WordStar's XON/XOFF for compatibility, but it is not necessary.

Let CP/M Handle Communicating:

Type ***N*** for no protocol in this menu, and ***L*** for the CP/M "List device" in the next menu, if you fall into one of these categories:

- If your CP/M system has a custom XON/XOFF or ETX/ACK driver to print at 1200 baud, and if it *works properly*, choose no protocol because the printer protocol should not be handled by WordStar.

- Choose no protocol if your CP/M system can print at 300 baud (or even slower) without any problems, and you are not interested in 1200 baud printing with communications protocols (because you have an unusual or old printer that has no protocols, or you do not have the documentation for your system that is needed to implement WordStar's protocols).

- Osborne computers are supplied with the SETUP .COM program. Using this program, Osborne owners can select 1200 baud printing with ETX/ACK or XON/XOFF protocol, or 300 baud printing with any "serial printer" (printer interfaced through a standard RS-232 serial cable). Osborne owners should first use SETUP, then choose no protocol in WordStar's INSTALL program.

Let WordStar Handle Communicating:

WordStar's INSTALL program can automatically install the appropriate protocol driver, given a useful "list driver" in CP/M or the specific port information. The options are as follows:

- If your CP/M system does not provide protocols, it can print at only slow speeds such as 300 baud. To print faster (at 1200 baud, suitable for most dot-matrix and daisy-wheel printers), select a protocol in this menu, and read the next section on "List Driver" carefully.

- If your CP/M provides the XON/XOFF protocol, you can also select XON/XOFF in WordStar's INSTALL program, and choose ***L*** as your list driver in the next menu.

The ETX/ACK protocol is widely used for daisy-wheel printers interfaced through both parallel and serial ports. Under this protocol, WordStar sends text in "messages" followed by the ASCII ETX (end of text) character (03 hexadecimal). After printing each "message" the printer sends the ACK (acknowledge) character (06 hexadecimal) back to WordStar, and WordStar sends the next "message."

The XON/XOFF protocol is used by some printers to interface through serial ports. Under this protocol, the printer transmits the XOFF character (ASCII DC3 code) to stop the transmission of text while it finishes printing the amount it has in its limited memory. WordStar stops transmitting until it receives the XON character (ASCII DC1 code) from the printer, signaling that more text can be transmitted.

List Driver

If you selected a "teletype-like" printer, or if you are letting CP/M handle printer communications as described above, select ***L*** for the "CP/M List device" in the "driver menu." You are finished with installing WordStar for your printer.

If you are letting WordStar handle communications with the XON/XOFF protocol, you should *not* use the CP/M "list device" unless your system provides a customized XON/XOFF driver for the CP/M LST: device. INSTALL warns you about this: "If you use selection L, patching will be required." However, the necessary patching may have already been performed — you may already have a customized XON/XOFF driver in your version of CP/M.

To check this before using INSTALL, use the CP/M STAT command by typing ***STAT DSK:***↵ from drive A. This command should display the CP/M logical device assignments — the "list driver" is usually the LST: logical device. If the XON/XOFF driver (usually called LPT: or UL1:) is assigned to the LST: logical device, and you can print from CP/M using the Control-***P*** toggle, you can use the "list driver" in the INSTALL menu along with the XON/XOFF protocol.

To be certain, consult your system documentation. You may have to use a configuration utility supplied with your system (sometimes called CONFIG.COM or SETUP .COM) to link the LST: device with the special XON/XOFF driver.

If you can not use the "list device," you have the following options:

T You can use the CP/M console device driver TTY: if your system is *not* currently using it for the console (display and keyboard), and if your version of CP/M supports multiple console device drivers (many do not). This driver provides the necessary ability to receive a protocol character from the printer, but *not* the ability to test for "printer busy" (not necessary with many printers).

C You can use the secondary CP/M console driver CRT: if your system is *not* currently using it for the console. In many systems, TTY: is used for the console and CRT: is provided to drive printers from WordStar and other programs. In many other systems, their roles are reversed: CRT: is used for the console, and TTY: is a "barebones" driver for accessing printers.
This driver provides the necessary ability to receive a protocol character from the printer, but *not* the ability to test for the "printer busy" (not necessary with many printers).

P The port driver bypasses the operating system (CP/M) and communicates with the printer directly through the computer's "ports." This option provides the best performance from within WordStar, but requires that you supply critical information found in your system documentation.

The Port Driver

To use WordStar's port driver, you must give WordStar's INSTALL program specific information:

- Whether your printer interface uses input/output ("I/O") ports or is "memory mapped." Most printer interfaces are through the computer's input/output ports, but some are memory-mapped. Consult your system documentation.

- The output data port number (or memory address if memory-mapped), the output status port number, and the output status bits.

- To use communications protocols, you also must supply the input data port and status port numbers (or addresses if memory-mapped), and input status bits.

If you cannot find this information in manuals or supplied documentation, you can try the experimental "Determine" function of the INSTALL program; however, this function is extremely limited as a tool for determining port numbers. The ideal port driver installation is one that uses port numbers and bits you specify from hard facts supplied in your system documentation or by your system dealer.

You can select the "Determine" function by typing ***D*** when INSTALL asks to determine the values or accept them from you. Type ***A*** to accept the values from you (this is infinitely better). The WordStar installation manual has many cautions and warnings against using the "Determine" function.

For example, you have to remove your disks while INSTALL tries to determine your port numbers. The "Determine" function may report success in finding the correct information, but may produce a version of WordStar that will not print. Further, INSTALL may "hang," requiring you to re-start the system.

When typing port numbers, you will be typing hexadecimal numbers that include as digits the letters A-F. You must use your system documentation to find this information, and you should also use the WordStar Installation chapters of your WordStar manual.

To use the "Determine" function, your printer must be connected properly, with paper, print wheel and ribbon set up for use.

The "Patcher"

The INSTALL program also lets you modify your version of WordStar using the "patcher." This function lets you change the contents of special locations within the WordStar program.

After making your terminal, printer, protocol and list driver selections (skip those you don't need), the installation program summarizes your selections and asks if they are complete and correct. If they are, and you do not want to modify WordStar's default settings for justification, help menus, or other features, you can answer ***Y*** and start running the installed WordStar.

If your selections are not correct, you can answer ***N*** for no and make new selections. You should also answer ***N*** if you want to modify WordStar's default settings.

After typing ***N***, INSTALL should display a summary of the "patching" process, followed by this message:

```
LOCATION TO BE CHANGED (0=END):
```

You can type a hexadecimal address, or a "label" for an address, or you can press RETURN to leave the "patcher." If you typed an address, even one that was not correct, you must type a ***0*** (zero) followed by RETURN to leave the "patcher."

The following is an example of changing a default setting. WordStar starts editing mode with the cursor movement menu showing on the screen, by default. You can change this default setting so that WordStar starts editing mode with no menu showing. To do this, you type the label of the "Initial Help Level" setting, ***ITHELP:***, followed by RETURN as shown:

```
LOCATION TO BE CHANGED (0=END): ITHELP:↵
ADDRESS: 0360H    OLD VALUE: 03H    NEW
VALUE:
```

If you forget the colon (:) at the end of the label, INSTALL will tell you that the address is not hexadecimal, or that the colon is missing.

The old value is a hexadecimal three (the **H** stands for the hexadecimal numbering system). You can type a number from 0 to 3, corresponding to the help levels 0 to 3 (used when setting help levels with the ↑***JH*** command in edit mode, or the ***H*** option from the no-file menu).

For example, to change the initial help level to two, type:

```
ADDRESS: 0360H    OLD VALUE: 03H    NEW VALUE:
2↵
```

Help level ***2*** causes WordStar to start without menus displayed. You can always display menus by changing the help level using ↑***JH*** from edit mode or ***H*** from the no-file menu.

If you change the initial help level, you may also want to cause the following message to display whenever WordStar starts:

```
For maximum help (full menu display),
select Help Level 3 by typing ↑JH3.
This message will clear when a key is pressed.
```

If you changed the initial setting to start WordStar without menus, this message tells beginners to re-set the help level if they want to see the menus.

To cause this message to occur, type the following label:

```
LOCATION TO BE CHANGED (0=END): NITHLF:↵
ADDRESS: 0361H    OLD VALUE: FFH    NEW
VALUE:
```

The value **FF** in hexadecimal is the highest hexadecimal number expressed in two digits (the next value is 100H). This value causes the message to be suppressed for normal WordStar operation (where menus are always displayed).

Change this value to 0, and the above message will be displayed when WordStar starts:

```
LOCATION TO BE CHANGED (0=END): NITHLF:↵
ADDRESS: 0361H    OLD VALUE: FFH    NEW
VALUE: 0↵
```

You can also specify a label with an *offset* value. For example, the justification on/off toggle is one byte above the label INITWF, and the hyphen-help toggle is four bytes above the label. To specify the address for the justification toggle, you type the label ***INITWF:+1***. To specify the address for the hyphen-help toggle, you type the label ***INITWF:+4***

Default Settings for Editing

The following labels are used by default for the initial settings (when WordStar starts):

ITHELP:

Change this byte to 0 (zero), 1, 2 or 3 corresponding to the initial **help level**you want.

NITHLF:

Change this byte from FFH to zero to display the message telling beginners to use the help level commands to reset the help level. This byte should be FFH to suppress this message (so that it does not display when a user changes the help level).

ITITOG:

Change this byte to zero to make WordStar start with **insert mode** off. Normally, this byte is set to FFH to start with insert mode on.

ITDSDR:

Change this byte to zero to make WordStar start with the **directory display** off. Normally this byte is set to FFH to start with the directory display on.

INITWF:+1

Change this byte to zero to start WordStar with **justification** off (ragged-right margins). Normally this byte is set to FFH to start with justification on.

INITWF:+4

Change this byte to zero to start WordStar with **hyphen-help** off. Normally this byte is set to FFH to start with hyphen-help on.

DECCHR:

Change this byte to ***2C*** to change the **decimal point** character in decimal tabs from a period to a comma for European numbers (2CH is the code for a comma). Normally this byte is set to 2EH to designate the period as the decimal point in decimal tabs.

HZONE:

Use a lesser value for more hyphenation pauses (to hyphenate shorter words as well as long words) during hyphen-help, or use a greater value for fewer pauses (to hyphenate only long words). Normal value is 4H.

PODBLK:+1

When starting a print or MailMerge operation, the question **USE FORM FEEDS** is always asked, and a simple RETURN or a reply other than ***Y*** causes WordStar to not use form feeds to advance to the next page during printing. Normally, WordStar advances by counting lines, which works with most printers. If your printer can handle form feeds properly, you can either answer ***Y*** to the question over and over, or change this byte to ***FF*** (FFH) to always use form feeds unless you explicitly type ***N*** to the question. Normally this byte is set to zero, so that the question takes any response other than ***Y*** as a "no" response.

ITPOPN:

Change this byte to ***FF*** (FFH) or any value other than zero to omit page numbers when printing, as if an ***.OP*** command had been inserted at the beginning of every document. An explicit ***.PN*** command must appear in a document to cause page numbering to occur. Normally this byte is zero to allow automatic page numbering, and when you want to omit page numbers use the ***.OP*** command in your documents.

Many more modifications and customizations are possible with WordStar. MicroPro International publishes the *WordStar Customization Notes* for users who want to extensively modify or customize their versions of WordStar. As we test some of these modifications to our version (3.0) of WordStar, we will be reporting on how to make them yourself.

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User's Guide
TO CP/M SYSTEMS & SOFTWARE

The Osborne Version of WordStar

The Osborne Portable Computer Packs a Small Screen With a Powerful Word Processor

The Osborne portable computer is a typical "CP/M, WordStar and SuperCalc machine" that is easy for beginners to learn how to use. However, those familiar with WordStar may not like the following two limitations of the Osborne that affect typical CP/M and WordStar operations:

- 50-column screen (50 characters across), rather than standard 80-column.
- Single-density five-inch disks, which can store only 92K bytes each (approximately 92,000 characters).

What does this mean to a WordStar user? First, the WordStar menus on the Osborne appear to be different, because they are prepared for 50-column screens rather than 80-column screens.

Second, the Osborne shows a 50-column "window" on the 80-column WordStar page, which you can manipulate by holding down the CTRL key and using the arrow keys.

Third, WordStar occupies considerable space on the disk in drive A, and the Osborne single-density format does not allow too much else to fit on that same disk.

Since the Osborne's differences make it difficult to describe "ordinary WordStar" without caveats and asides, we are introducing the Osborne separately, and at the appropriate place in the text, we refer readers to the WordStar tutorial.

What Is the Osborne?

The Osborne is a portable computer with a five-inch screen, a full-size alphanumeric typewriter-style keyboard with additional calculator-style numeric 12-key pad, two floppy disk drives, one serial RS-232 port, one modem port, and one parallel port, in a case the size of a portable sewing machine that fits under an airline seat and weighs under 25 pounds.

The Osborne is supplied with CP/M®, WordStar® for word processing, MailMerge® for form letters and printing from mailing lists, SuperCalc® for calculating on spreadsheets, and both CBASIC® and MBASIC® for BASIC programming.

SuperCalc is not hampered by the Osborne's small screen. The window on the SuperCalc worksheet is smaller than on other displays, but the program functions in the same way. The directional (arrow) keys and calculator-style numeric keypad make it easier to enter data onto SuperCalc worksheets.

CP/M on the Osborne is enhanced with a HELP facility, disk COPY and XDIR utilities, and use of the "auto-start" feature of CP/M that automatically starts programs. The Osborne version of CP/M can run any CP/M program that can be installed for the Osborne 01 display screen.

What is WordStar?

WordStar is a writing and editing program supplied with the Osborne that provides most of the functions available on larger, more expensive word processors.

Wordstar lets you rewrite and edit paragraphs without retyping them, and move paragraphs within a document or to other documents without retyping them. When you're finished editing the document, you can print it with justified margins if you like, or use other printing options to produce clean, fine-looking reports.

WordStar shows you the text on the screen as you type it, underneath a "menu" displaying the WordStar editing commands. If you type enough text to fill more than one page, WordStar draws a a line across the screen showing the end of each printed page.

WordStar's left and right margins on the screen are exactly the same when the text is printed using WordStar. You can position words anywhere on the screen, using blanks to fill spaces, and draw simple graphics using various characters. What you see on the screen is exactly what you see on the printed page.

Preparing a Data Disk

Reach behind your Osborne and turn it on. The screen should display a sign-on message, telling you to insert a disk into drive A and press your RETURN key. We use the ↵ symbol to tell you to press your RETURN key.

Before starting WordStar, you should create a *data disk* to hold your new text files. If you have a data disk already formatted for use with your Osborne, skip to the next section on starting WordStar.

Find your system disk that has the COPY utility. Insert this disk into drive A. The disk should display a "menu" of help messages (try them). Press your ESC key to "escape" from this menu.

When your cursor is finally sitting next to the **A>** prompt, type the word ***COPY*** and press ↵ (your RETURN key). The COPY utility offers three choices: ***C*** to copy a disk, ***F*** to format a disk, and the RETURN key to leave the COPY utility.

Press ***F*** to format a disk. The COPY utility then asks you to select the disk to format (disk drive A or B). Insert a new disk into the B drive, and type ***B***, then press RETURN. The COPY utility formats the disk and verifies that all tracks are usable.

You can leave your data disk in drive B after the formatting operation. Press RETURN to leave the COPY utility.

You have up to 92K of space on a blank data disk. However, we suggest that you put the COPY.COM and XDIR .COM utility programs on every new data disk. COPY.COM occupies 4K, and XDIR.COM occupies another 4K.

XDIR.COM will show you an alphabetized file directory with the sizes of each files and the amount of disk space available for more files. COPY.COM is the COPY utility which lets you copy an entire disk, or format a new disk. Both are useful utilities to have on your data disk.

To copy these utilities to your data disk, use the PIP utility. PIP.COM lets you copy one or more files to another disk or device. PIP.COM will also let you make a copy by another name of a file on disk, but WordStar has its own copy command to do this. Since PIP.COM occupies 8K and COPY .COM only occupies 4K, you can put COPY.COM on your data disks and leave PIP.COM on the HELP system disk to use when you need it.

To copy the COPY.COM and XDIR.COM files to the data disk in drive B, type the following command:

```
A>PIP B:=COPY.COM↵
A>PIP B:=XDIR.COM↵
```

When you finish these operations, check the data disk to see if copies were sent:

```
A>B:↵
B>XDIR↵

COPY     .COM     4k
XDIR     .COM     4k


        Disk B: 84K blocks
        Size = 92K, 2 Files,  Used = 8K, Space = 84K
```

The XDIR display tells you the size of each file, the total size of the disk (92K), the number of files, the space occupied by these files (8K), and the space available for use (84K). A "K" is approximately 1000 characters of text.

After all disks have stopped moving, remove your system disk from drive A.

Starting WordStar on the Osborne

Press the RESET button on the front of your Osborne. The Osborne sign-on message should appear, telling you to insert a disk into drive A.

Insert your WordStar disk into drive A, and press ↵. The light should go on, and the Osborne logo should appear on your screen, followed by the first WordStar menu:

```
                     editing no file

D=create or edit a Document file             H=set Help
H=create or edit a Non-document file         X=eXit to
M=Merge-print a file                         P=Print a  file
F=File directory off (ON)                    Y=delete a
L=change Logged disk drive                   O=cOpy a file
R=Run a program                              E=rEname   a
```

In addition, there should be a directory of the files on the disk in drive A. This directory should include the files WSMSGS.OVR, WSOVLY1.OVR, MERGPRIN,OVR, WS.COM and AUTOST.COM. There should also be a sample text file included with your master WordStar disk called SAMPLE.TXT. We use all of these files in this tutorial except MERGPRIN.OVR (MailMerge), which is covered in another article.

To see more names in the directory display, hold down your CTRL key and press the left-arrow directional key. The entire screen should scroll to the left, revealing more of the menu and directory displays.

Logging In Drive B

Before editing the SAMPLE.TXT file, you should insert a *data disk* into drive B. This disk will hold your text files. You should use text file disks to hold your text files, since you have no more room on your WordStar system disks.

The "logged disk drive" in WordStar is the drive WordStar uses to find your text files. WordStar always starts by using the drive from which it was executed as the "logged disk drive", until you change it.

To change the "logged drive" to drive B, press ***L***, and the following message should appear on your screen:

```
THE LOGGED DISK DRIVE IS NOW A:

NEW LOGGED DISK DRIVE (letter, colon, RETURN)?
```

Type ***B:*** as shown, and press the RETURN key:

```
NEW  LOGGED  DISK  DRIVE  (letter,  colon,  RE-
TURN)?B:↵
```

The light on drive B should turn on while WordStar is reading the disk. WordStar should then display the file directory for drive B. The directory will be empty if you have no files on this disk. It will show COPY.COM and XDIR.COM if you have them on your data disk.

Copying SAMPLE.TXT to Drive B

You should not edit the file SAMPLE.TXT that now resides on drive A. Use WordStar to copy the file to the disk in drive B, the newly "logged" disk drive.

Type an ***O*** to copy a file. WordStar asks:

NAME OF FILE TO COPY FROM?

Type ***A:SAMPLE.TXT*** and press the RETURN key (remember to include the ***A:*** prefix). If you make a typing mistake, use your left-arrow key to move the cursor backwards and erase the typing mistake.

NAME OF FILE TO COPY FROM?*A:SAMPLE.TXT*↩
NAME OF FILE TO COPY TO?

To answer the second question, type ***B:***, then hold down your CTRL key and type an ***R***. The CTRL-***R*** command remembers the filename ***SAMPLE.TXT*** from the previous question, and retypes it for you.

Now press RETURN, and WordStar copies the file to drive B. When the transfer is done, WordStar displays an updated file directory showing SAMPLE.TXT on the disk in drive B. You are now ready to edit the file.

Moving and Scrolling Your Screen

The WordStar editing menu on the Osborne computer shows the same commands as the normal WordStar main menu, but in a different layout. The Osborne version shows the cursor movement commands first, although these commands are not necessary — you can use the Osborne's cursor movement keys (arrow keys) to move left, right, up and down.

The Osborne screen is a window on the WordStar electronic page. To move this window, hold down your CTRL key and use the cursor movement keys. You will see the right margin of the text and menu by holding down the CTRL key and using the left-arrow key.

To return the window to its original position, hold down the CTRL key and press the left bracket key (***[***).

To display more text, you move the WordStar electronic page by moving the cursor line by line, until you get to the bottom of the file. To get to the bottom more quickly, hold down your CTRL key and type a ***C***.

As you type CTRL-***C***, WordStar displays **↑C** in the upper left corner of your screen. The ↑ symbol stands for the CTRL key. Most WordStar commands are typed by holding down the CTRL key. All menus use the ↑ symbol to stand for the CTRL key.

The file SAMPLE.TXT is a "demo" of many of WordStar's features, so don't be alarmed by the unfamiliar WordStar commands shown in the text. After reading the WordStar tutorial in this issue, you will know how to use all of these features.

Problems With Large Documents

Osborne single-density disks can hold only 92K bytes each. With WordStar's files occupying the disk in drive A, you must use drive B for your text files. You barely have enough room to squeeze the additional COPY.COM to drive

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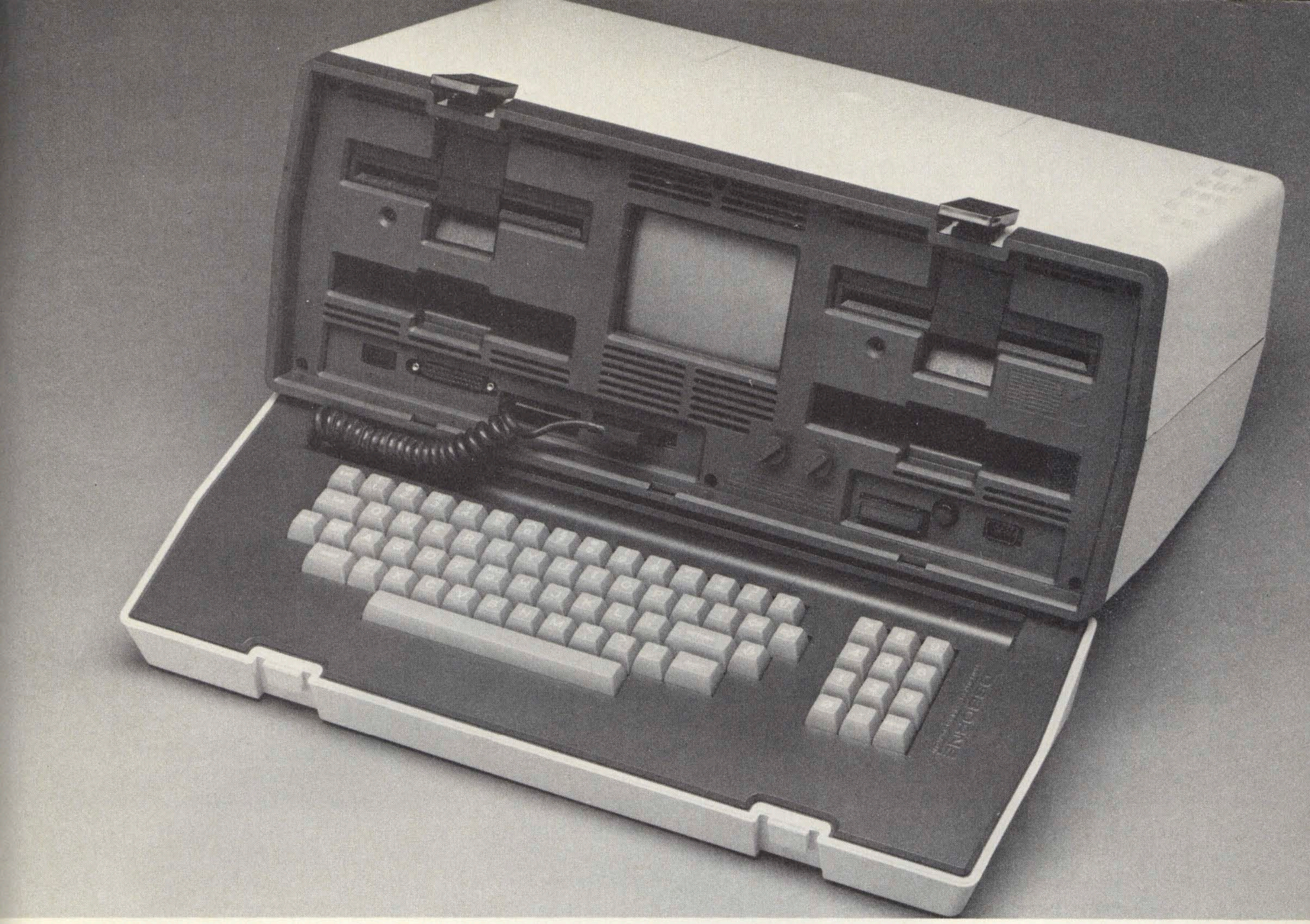

A. (You may have to erase SAMPLE.TXT on drive A to fit COPY.COM on the same disk.)

If you are planning to write a large document (over eight printed pages), we strongly suggest that you break the document into sections of 6-8 printed pages. To edit a file, WordStar must create a backup copy of the file on the same disk, and use more space on that disk to create a temporary workspace. Generally, WordStar needs *twice* the size of the file you are editing.

If you keep your files to six printed pages each, they will each occupy only 12K-15K. WordStar will need another 30K of disk space to edit one of the files. Since you will only edit one file at a time, you can fill your text file disk with as much as four 15K files (60K), and be able to edit each one. However, you will have to erase the *backup* files.

Backup files are created automatically by WordStar to hold the previous version of the file in case you make an editing mistake. Backup files have the same names as your files, but with the extension ".BAK" instead of the extension you provided for your files. You can erase them if you don't need them, by typing ***ERA *.BAK***⊃. *You cannot edit a backup file and save the editing.* You must first rename the file to have an extension that is not ".BAK", then edit the newly named version.

Printing Sections of a Document

There are two simple ways to print files that are parts of one document, and print the page numbers correctly. In both cases, you must end each file's last page on a printed page boundary, except the last file (which does not have to end on a page boundary).

WordStar shows page boundaries on the electronic page with a line of dashes, and skips past such boundaries to the next page when printing. If the page at the end of the first file ends mid-sentence, the next file can begin with the other half of the sentence.

If you have MailMerge, you can use the ***.FI*** command at the end of the first file to "call" the second file to the printer. Use another ***.FI*** command at the end of the second file to "call" the third file, etc. Each file will be printed in the order you specify using these commands.

To use the ***.FI*** command, type the command and the filename of the file to be printed next in sequence, then type the keyword ***CHANGE***:

```
.FI NEXTFILE.TXT CHANGE⊃
```

This dot command lets you replace the "logged" disk with another disk containing the file (you can keep files on separate disks).

A complete MailMerge tutorial is planned for a future issue of *User's Guide.* Until then, keep your Osborne cool and dry, and cover it when you take it out in the rain. A computer is still a computer, even when it's portable.

Brief Looks At CP/M Systems...

JobStream CP/M from Aton International

A version of CP/M for the Radio Shack Model II

CP/M® for the TRS-80® Model II computer from Radio Shack® is offered only by independent firms. Tandy-Radio Shack has never directly offered CP/M for their microcomputers, nor does Radio Shack endorse or support the system. However, many TRSDOS® users (the operating system supplied by Tandy-Radio Shack for the TRS-80 Model II computer) switch to versions of CP/M offered by companies such as Aton International, Lifeboat Associates, Pickles & Trout, and Parasitic Engineering.

JobStream® CP/M is a software system from Aton International that turns an ordinary TRS-80 Model II computer into a full-blown CP/M system with extraordinary capabilities.

JobStream CP/M comes in two levels: Level 1 is a standard CP/M system for Model II computers with 64K, and Level 2 requires 96K of internal memory and offers cache disk buffering for faster disk access. Level 2 JobStream CP/M can run standard CP/M programs faster than most other CP/M systems available for Model II computers.

JobStream CP/M takes advantage of the memory bank switching hardware that comes standard with the TRS-80 Model II (up to 256K bytes of RAM can be installed). Level 1 will run in the standard 64K Model II, and Level 2 will run if you have 96K or more of RAM installed in your Model II.

Level 1 can run programs up to 62K in size (this is more program space than usual), and Level 2 (with extra memory) can run programs up to 200K, through the use of memory bank-switching (invisible to the user). Using the extra memory banks for disk track buffers increases the speed of JobStream CP/M — SUBMIT operations take half the time, and record indexing operations with dBASE II take one-third the time, according to benchmarks published by Aton comparing JobStream CP/M (both levels) to Pickles & Trout's and Lifeboat Associates' versions of CP/M for the TRS-80 Model II computer.

What does JobStream CP/M look like? At first, it resembles most other CP/M systems, with the exception that it displays your serial number in the startup message, so that service technicians can verify that your copy of the system is a valid one. Level 2 also displays the memory bank switching assignments.

One feature of JobStream CP/M lets you switch disks without worrying about performing the CONTROL-C ("warm boot") command. The system checks each disk drive every quarter of a second to see if the door has been opened. If it has, the system automatically changes the disk space map to accomodate the new disk, and to prevent accidental or intentional damage (from writing to or copying to the new disk using the old map).

Disk formats (for eight inch floppy disks) offered by JobStream CP/M include the Pickles & Trout and the Lifeboat Associates double density formats, as well as the Aton double density format and the standard CP/M single density format. Aton can also format double sided disks.

Perhaps the most idiosyncratic features of JobStream CP/M are its ability to transfer TRSDOS files to the CP/M format, and its VisiCalc® Surrogate and BASIC Surrogate programs. For $99 (plus tax), the VisiCalc Surrogate program translates your Radio Shack version of VisiCalc (not available for standard CP/M systems) into a new VisiCalc program that can run with JobStream CP/M! The BASIC Surrogate program translates TRSDOS BASIC to CP/M, so that all your TRSDOS BASIC programs can run in the JobStream CP/M system.

Those familiar with standard CP/M may appreciate the enhancements of JobStream CP/M that let you read other double density disk formats, switch disks without having to perform the CONTROL-C (↑**C**) command, set the time and date, and perform operations faster with disk track buffering. Other enhancements include a special line at the top of the screen for helpful error messages that tell you if the printer is out of paper or not connected, or if the disk is write protected, and so on.

Aton is the first company to ship a version of CP/M 2.2 tailored for Radio Shack's hard disk (Model II and Model 16) microcomputer systems.

For $279, TRS-80 Model II and Model 16 owners get CP/M 2.2 with a hard disk adaptation. If you already own an Aton CP/M system, the hard disk software upgrade is available separately for $125 (the hard disk is available from Radio Shack). Dealer discounts are available for volume orders.

With Aton's hard disk CP/M 2.2, you can simulate a multiple drive system by dividing your hard disk into "logical" drives. Aton's hard disk CP/M allows you to back up files stored in one "logical" drive to another "logical" drive on the same hard disk, or to a different hard disk or to multiple floppy disks.

Formatted disk capacity is 8 megabytes, which is the maximum size data file Aton CP/M can handle. Flawed sectors, bad tracks and other problems are automatically detected and corrected.

The Aton hard disk CP/M system can be used with or without a floppy disk, and allows you to run either the TRSDOS or CP/M operating system. Both TRSDOS and CP/M programs can be stored on different parts and in different formats on the same hard disk.

JobStream CP/M for Radio Shack TRS-80 Model II computers is available from Aton International, 260 Brooklyn Ave., San Jose, CA 95128 USA.

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Glossary...

Continued from page 47

buffer: As in *the print buffer is currently empty.* Buffer refers to a temporary storage space in memory used to hold data that is to be used by a device attached to your computer. A printer printing at 300 baud will lose data sent to it at 600 baud, unless there is a buffer to temporarily store the data.

byte: As in *the data is sent in 128-byte blocks.* A byte is a unit of measurement of information, where the information is coded in binary numbers. Each "1" or "0" in a binary code number takes up one *bit*, and eight *bits* make up one byte.

One byte is roughly one character of information (a letter, digit, punctuation symbol, space between words, etc.). Bytes are measured in multiples of 16; e.g., one *kilobyte* (as in 64K, where "K" stands for one kilobyte) is 1024 bytes, and one *megabyte* is 1024K (1024 x 1024) bytes. These measuring units are used to describe memory storage capacity, as in *This hard disk can store up to 2.2 megabytes (2.2M or 2.2Mb).*

CP/M: The most popular meaning is "Control Program for Microcomputers." CP/M is the most widely used operating system on personal computers. It allows programs to be written for one computer and then moved and run on another computer that also runs CP/M. It also provides a file structure and storage method that allows you to transfer data easily from one computer to another. There are over 3000 commercial programs and 3000 public domain programs written to run on most (if not all) CP/M systems. There are over 600 brands of computers that run CP/M, and an estimated 700,000 installed systems as of September, 1982.

cursor: The pointer on your computer display where all editing operations take place. You can move your cursor with cursor positioning commands or cursor "arrow" keys.

data base: General name for a set of files containing any sort of data. Information services carry many independent data bases (data files from information providers). You can set up your own data bases with data base management programs.

default settings: Complex word processing programs provide so many commands and options that certain settings for these commands and options are pre-set for typical usage. For example, *when we start running WordStar, its defaults are set to justify margins and print on 8.5 x 11 inch paper.*

disk drive: Flexible (floppy) or hard disk storage device used with computers to store files. Flexible disks and disk cartridges are usually removable (for use in archiving data).

dot commands: WordStar and other word processing programs provide special commands to control printing. These commands are imbedded in the text file, at the locations where printing effects (such as page numbers, headings, etc.) are to occur. They usually start with a period (.) in the first column and line in the file.

electronic page: A simulated printed page, with the page break displayed on your screen as a line of dashes (WordStar).

ETX/ACK: The ETX/ACK protocol is a popular one used in data communications between host computers and printers as well as between two personal computers or two large computers. Usually this protocol is "invisible" to the user and completely automatic. A protocol is usually required to send data to a printer at 1200 baud, but usually not required at 300 baud.

file: Any collection of data, such as a document or part of a document, a data base of customer records, or a financial report, or any collection of program instructions (a program).

filename: A name to call the file and to use to retrieve it. Filenames consist of a primary name (up to eight characters not including * or ?), and an extension or file type (up to three characters such as ".BAK" or ".TXT").

function keys: Specially preprogrammed keys on a keyboard that perform specific functions provided by a word processing or other program.

hyphenation: As in *WordStar's hyphen-help feature helps you control*

Continued on page 66

Glossary...

Continued from page 65

hyphenation in your paragraphs. To re-form paragraphs and justify them without extra spaces, you can have the word processing program suggest where to hyphenate words (break words with a dash). Some programs use "hard" hyphens that remain unless you delete them, and other programs use "soft" hyphens that will disappear if the paragraph is reformed and they are not needed.

justification: As in *newspaper columns usually have justified right and left margins.* Most word processors provide the capability to type paragraphs whose lines are filled with spaces so that words begin and end flush with each margin. Left margins are usually always justified; right margins can be justified or "ragged-right" (non-justified).

logged disk: As in *if you do not type a disk drive prefix, WordStar stores the text in a file on the logged disk.* The logged disk is usually drive B (text file disk) in a CP/M system (system disk in drive A). Programs such as WordStar automatically save the contents of memory to a file on the logged disk, unless you type a specific drive prefix with the filename.

modem: As in *I use my modem to send my electronic documents to a typesetting service.* A modem (an abbreviation for modulator-demodulator) is a device you can use to connect your computer to your telephone. Modems convert telephone signals (tone variations) into digital signals understood by computers. They also convert digital signals into tone variations, so they are two-way communication devices. Modems are used to send and receive data, and vary in price.

network: As in *this local network consists of six microcomputers connected by cables to a hard disk.* Computers or terminals can be connected to each other by cable (local network) or over telephone lines or through other telecommunications equipment. The computers can send electronic documents and other data to each other, and share more expensive devices such as hard disks and printers.

protocol: A way for devices to "shake hands" with the computer so that the computer knows when to send more data to a slower device, or receive data from a slower device. Since computers process information at high speed, a protocol is usually required to operate a printer at speeds higher than 300 baud.

reading a file: Although you can read a file by scrolling through its contents, the technical definition of the phrase describes inserting the entire contents of a disk file into the file you are editing, at the location of the cursor. See "boilerplate."

RS-232: As in *my printer connects to the RS-232 serial port.* The Electronics Industry Association (EIA) developed a standard for cable connectors used to connect computers to printers, modems and other devices, known as the EIA RS-232C standard. The standard specifies the hardware connection between the computer and the device, as well as the serial transmission protocol.

RUBOUT: The RUBOUT, or DELETE key (DEL or BACKSPACE on some keyboards) will move your cursor backwards one column position and erase the character in that position.

scrolling: As in *the scrolling commands let you display an entire document in sections on your screen.* As a paper scroll would unwind, electronic scrolling "unwinds" your electronic document showing screens of text at a time. Commands let you scroll text up and down (vertically) and from right to left (horizontally).

spread-sheet: As in *I created a budget spread-sheet using SuperCalc.* Using "calc" programs (patterned after the original VisiCalc) you can create, change and store financial tables with complex formulas, or numeric tables using arithmetic and trigonometric functions, in spread-sheet form ready for display and printing.

telecommunications: The transmission of data to and from computers and terminals via phone lines, cable, optical fibers, TV, FM radio waves or satellite transmission.

text editor: A program that provides at least the rudimentary functions of a word processor: commands to insert, replace, delete, move, store and retrieve text. Text editors are primarily used by programmers; document writers often prefer to use word processors.

underscore: The character used for underlining spaces or words.

word processing: Activities involving the handling of text. Early word processing machines were "dedicated" machines (hidden computers) that could perform only text manipulation and printing.

Personal computers can function as word processing machines as well as complete computers. Programs such as WordStar provide complete word processing functions: writing, editing, storing and retrieving files, moving and copying sections of text, making quick substitutions, and producing reports and printed documents.

word processor: Originally, the term described a machine dedicated to word processing activities. Personal computers can run programs that perform the same functions as a word processing machine, and the programs (such as WordStar, SuperWriter, Magic Wand, etc.) are called word processors.

wrap-around: As in *my word processor wraps lines around as I type them.* The wrap-around feature is found on most word processors to allow typists to continue typing an entire paragraph before pressing the RETURN key. When you reach the end of a line, the program automatically starts your typing on the next line. Most programs will break lines only on spaces; therefore, if you type a line without any spaces, it may not wrap around properly to the next line if you extend past the right margin.

writing to file: As in *WordStar lets you write a block of text to another file.* When you mark a section of text and issue a command to copy the text to another file on disk, you are "writing" data to the other file.

XON/XOFF: The XON (Control-Q) and XOFF (Control-S) protocol is a popular one used in data communications between host computers and printers as well as between two personal computers or two large computers. Usually the XON/XOFF protocol is "invisible" to the user and completely automatic. Users use the protocol (sometimes without knowing it) whenever they use Control-S to stop their screen's scrolling activity and Control-Q to resume the scrolling activity.

A protocol is usually required to send data to a printer at 1200 baud, but usually not required at 300 baud.

LETTERS

Congratulations on an excellent survey of CP/M. I look forward to your next issue.

I would like more detailed information on the following as referred to in Kelly Smith's article *Stat*:

- How to contact the CP/M-Net RCPM system
- General information regarding RCPMs
- Sources of CP/M Utilities.

Wil Carter, President
Ceco Financial Securities Corp.
P. O. Box 8219
Fountain Valley, CA 92708

I hope you plan some in-depth reviews of software and packages! There are only so many tutorials I can take involving an operating system I've been using for six years.

Stephen Platt
Philadelphia, PA

Congratulations on a great start with *User's Guide*. It's very well done and way beyond the quality of a newsletter. I hope with all of the CP/M users out there that you get all of the support (subscriptions) and all of the input (content) that you'll ever need to keep it going on.

Just when I thought I would never hear from you again, the first issue appeared in my mailbox! I read much of the issue already and I've got two observations.

First, since I have an OSBORNE 1, I know I don't want to hear that I'm using the "Volkswagon" of Computers. If VW's got all of the support and backup from the manufacturer that OSBORNE users get, their sales would be a lot better!

Secondly, in the article entitled "Using CompuServe," you mention in the section on communications software that you intend to compare modem programs in a future issue. Well, please get Microstuf's CROSSTALK program in there. I just purchased it, and although I just got started using it, it looks pretty good. But, at the same time, I'd like to know how it stands up to others and which ones will work with some RCP/Ms, PMSs and BBSs and why they will or won't work.

With that, I wish you all of the best. As a beginning user, I can only offer ideas on what to cover by presenting you with the areas I am most uninformed (and ignorant). I hope to learn a lot more by reading your mag.

Carl J. Warner
Beaverton, OR

Public Domain Software

I appreciated reading your premier issue of *User's Guide*.

I do not have a modem, and thus cannot communicate by telephone to pick up the programs you list on page 54 of your premier issue. I have an Intertec Superbrain Quad. Is there someone who might send to me those programs with some documentation on a disk compatible with my system?

Eldon L. Colton, Attorney
404 First St. S.W.
Cedar Rapids, Iowa 52404

Write to CPMUG (CP/M User Group), 1651 Third Ave, New York, NY 10028, and the SIG/M (Special Interest Group/Micros), Box 97, Iselin, NJ 08830. Join or start a user's group in your area.

If, sometime during the next six issues, you show me how to access a disk directory, I will feel well justified in sending you my sixteen bucks (charter subscription). Of course, if you would like to elaborate on the directory's organization, that would save me some additional effort. Thanks, and good luck —

Bill Simpson

Modifying a BIOS?

I have just received TUG #1. Looks like you're off to a good start. You do, however, leave my one big question unanswered. "How do I change a 42K CP/M to a 60K CP/M that ORG's at E800?"

I am aware that there are instructions in the manual. I am not yet

Continued on page 68

Letters...

Continued from page 67

skilled enough to understand them. For example, when I am told to "examine the area at 1F80H..." I do, but I don't know what I am looking for. Similarly, what do I look for at 900H...?

How about a step-by-step, thoroughly explained procedure that can be used to reconfigure and also initially set up CP/M? It should include examples of values (maybe a series of tables) that we would use, the method of calculating them and what to expect during the "examinations."

It is highly possible that all I ask for is really inside the *CP/M 2.0 Alteration Guide* and that I just can't see it. I can use all the help I can get, so enter my year's subscription to *User's Guide*.

Keith von Borstel
4481 Slodusty Road
Garden Valley, CA 95633

I *am* impressed. Having read a lot of magazines and books concerning computers and operating systems, I have found few that really provide the reader with a sense of profit in his investment — that profit being a meaningful learning situation.

User's Guide is truly what it professes — a guide — and a well-written, clearly defined and resourceful magazine. I'm not referring to the first article or the last — I'm stating that the *User's Guide* is well-balanced, informative and written in down-to-earth clarity.

It is encouraging to subscribe to a magazine that executes to its fullest what it professes. I found each article informative, enlightening and well worth every cent of investment.

I am one to read one article and quickly dispose of the product if it has not contributed to my knowledge. This is to say that I don't care to have to interpret what the author is saying; have to pull out a dictionary to fight the dialogue or wonder if what I read was what I read.

I will be enthusiastically endorsing your magazine at any opportune time (work, HUG meetings, customer relations, bulletin boards, etc.), and I look forward, *impatiently*, to number 2 (3,4,5,6...).

Pat McNamara
Customer Engineer
Control Data Corporation
Englewood, CO

Article Submission Guidelines

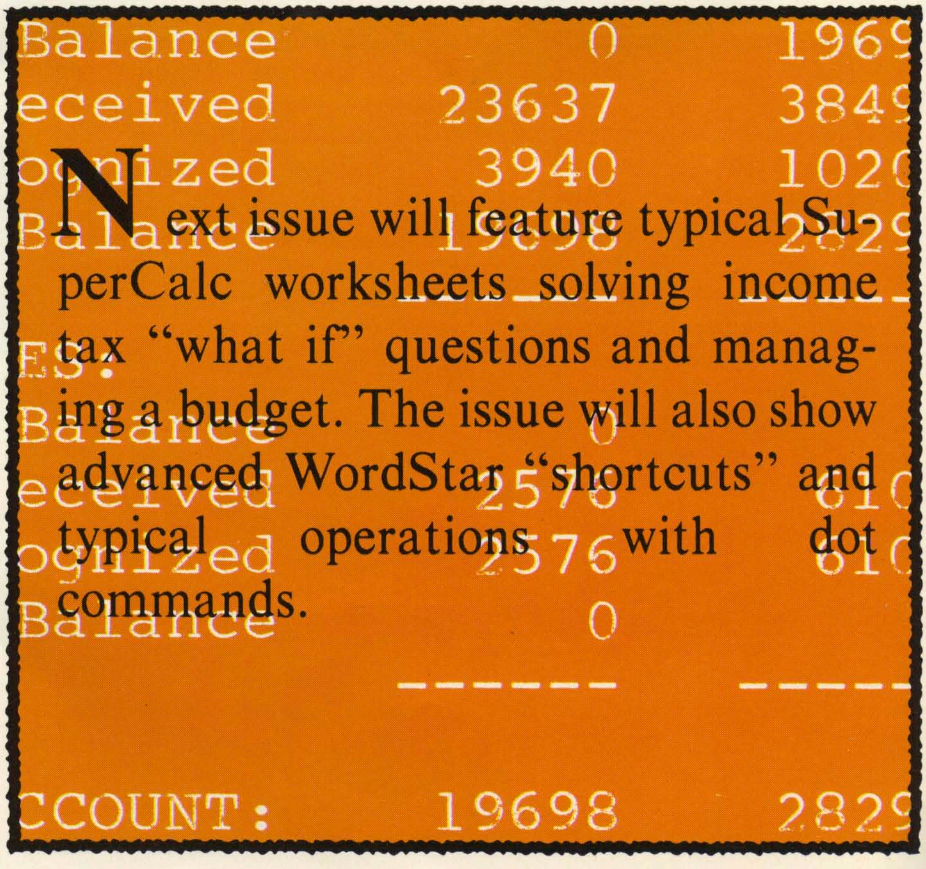
User's Guide magazine is now in its "humble beginnings," and we want to provide articles that are of use to CP/M users. *User's Guide* is a magazine of quality documentation, with in-depth articles on using specific software products. We are looking for articles that would fit in with our writing style and point of view.

Query us first with a self-addressed and stamped envelope if you wish a reply. If you send an article, send also a stamped self-addressed envelope to use to return the manuscript to you.

A better way to reach us is by leaving a message on CompuServe (ID no. 70105,722) or Kelly Smith's RCPM system (805-527-9321 automatically answered by a computer). We are equipped to receive text files over the telephone at 300 baud using MODEM7 or PLINK.

Use any word processor to write your article. Try to use five-space tabs (not fixed tabs) to indent each paragraph, and leave a blank line between paragraphs. *Please do not use WordStar print control codes.*

We are looking for technical contributors as well as writers. If you can describe something that would be of interest to CP/M users in general, or users of a specific system in particular, you can submit raw material for co-authorship with a staff writer. Contact us for further details: *User's Guide*, P.O. Box 3050, Stanford, CA 94305.

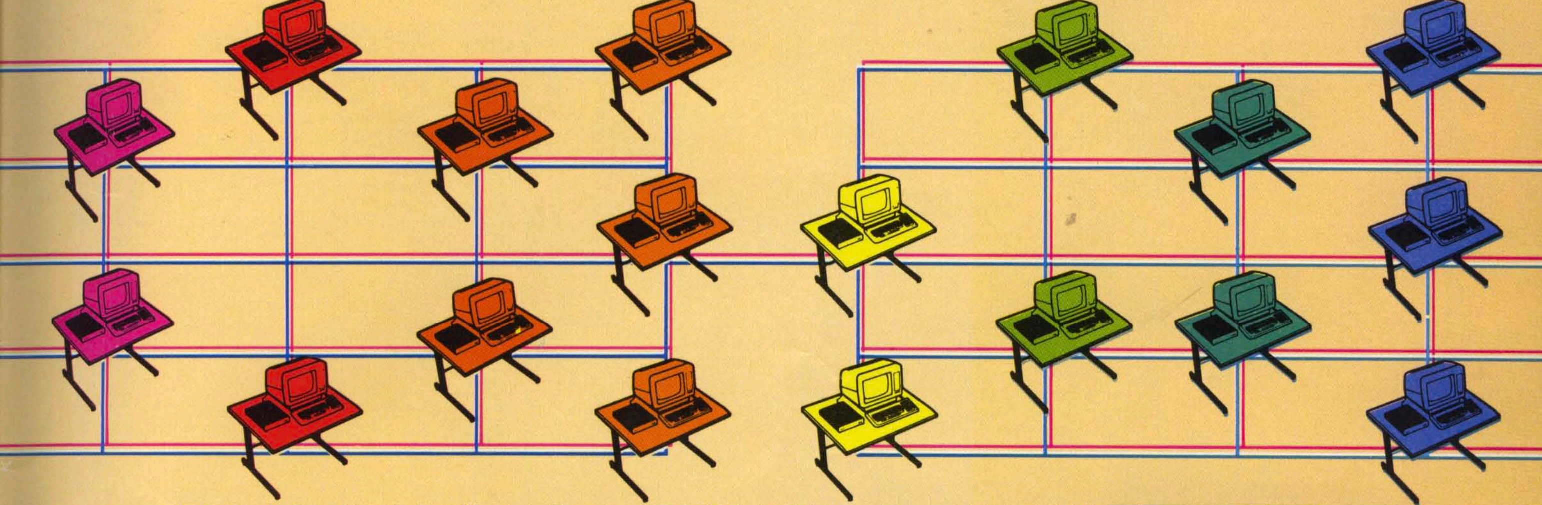


Next issue will feature typical SuperCalc worksheets solving income tax "what if" questions and managing a budget. The issue will also show advanced WordStar "shortcuts" and typical operations with dot commands.

Alspa

ZERO

ANNOUNCING THE HIGH SPEED, LOW COST NETWORK



The **ZERO** is designed to bring high performance LOCAL AREA NETWORKING to users at budget prices.

The **ZERO** and **ZERO-NET** are unique. Any **ZERO** station can be a Network Master or Network Remote, permitting, for the first time, a low cost **non stop** network.

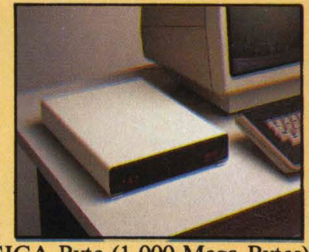
The **ZERO-NET** features a High Level Data Link Controller (message synchronous) at 400K bps carried over a simple twisted pair cable. To achieve maximum speed and reliability we use collision detection/avoidance circuitry and automatic CRC error detection/retransmission.

Each **ZERO** computer in the net can have Floppy Disk and/or Winchester Drives. The **ZERO** itself is a Z80 based Microcomputer with 64K Ram, 2K to 16K of EPROM, 2 Serial ports, 2 parallel ports, floppy disk controller, Z80CTC counter-timer and Z80DMA direct memory access.

The **ZERO** hardware design was optimized for TURBODOS*, (CP/M**, MP/M** compatible) including such enhancements as console type-ahead (buffering), 1.416 Mbytes per 8 inch double-sided floppy, multi-processing (background processing) such as print spooling, etc.

KEY PARAMETERS

- Local Area Networks up to 256 nodes per NET, with any mix of Master and Remote stations. Each station may support up to 16 logical drives, local or remote.
- Local Area Networks may be linked through gateways.
- Per Node — 0 to 2 floppies and 0 to 4 hard disks with appropriate Driver Modules.
- Per Node — parallel and/or serial printer.
- Each user can control print routing and/or spooling.
- Each node may reference a file system and/or printer on any other node.
- Each node may have an Autostart Log-on with security access protection.
- Each node may have a FIFO type Electronic Mailbox.



- Each node may operate with MP/M compatible file/record interlocks, or with special TURBODOS relaxation rules.
- Maximum recommended buss length of 4,000 L.Ft.
- Full CP/M and MP/M compatibility.
- The TURBODOS operating system can support up to one GIGA Byte (1,000 Mega Bytes) per logical drive.

The **ZERO-NET** product family — the **ZERO**, the **ZERO/FD**, the **Z-DRIVE** and the **ZNT** terminal — all the components required to configure an entire system are available for immediate delivery. The **ZERO** provides a microcomputer network that OUTPERFORMS many multi-user minicomputer systems at substantially lower cost. While the competition is still studying it, **ALSPA** has done it!

ZERO-NET

Alspa Computer, Inc.

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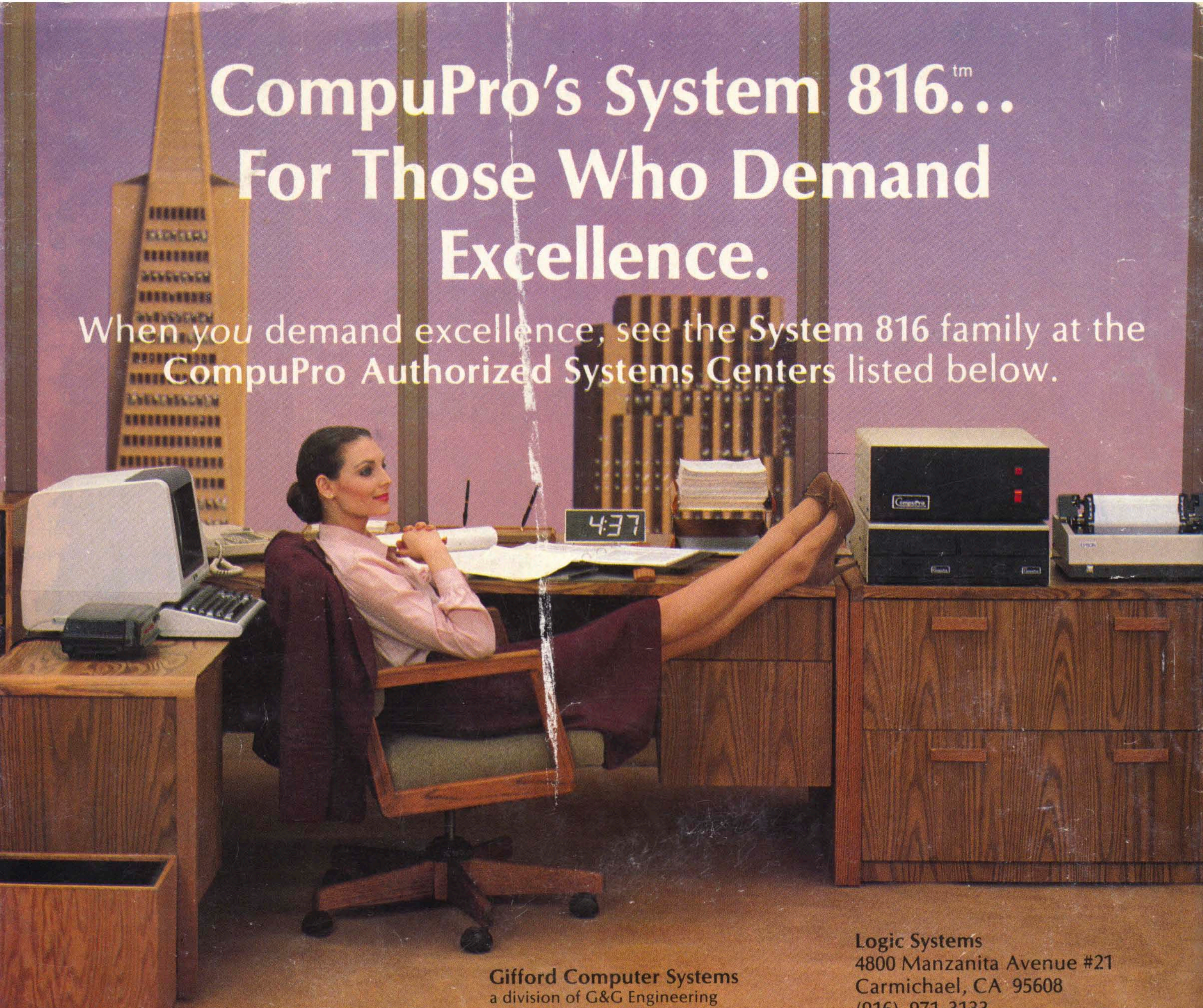

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